JANUARY, 1931
Vol. XLIV, No. 1
30 Cents $4 a Year

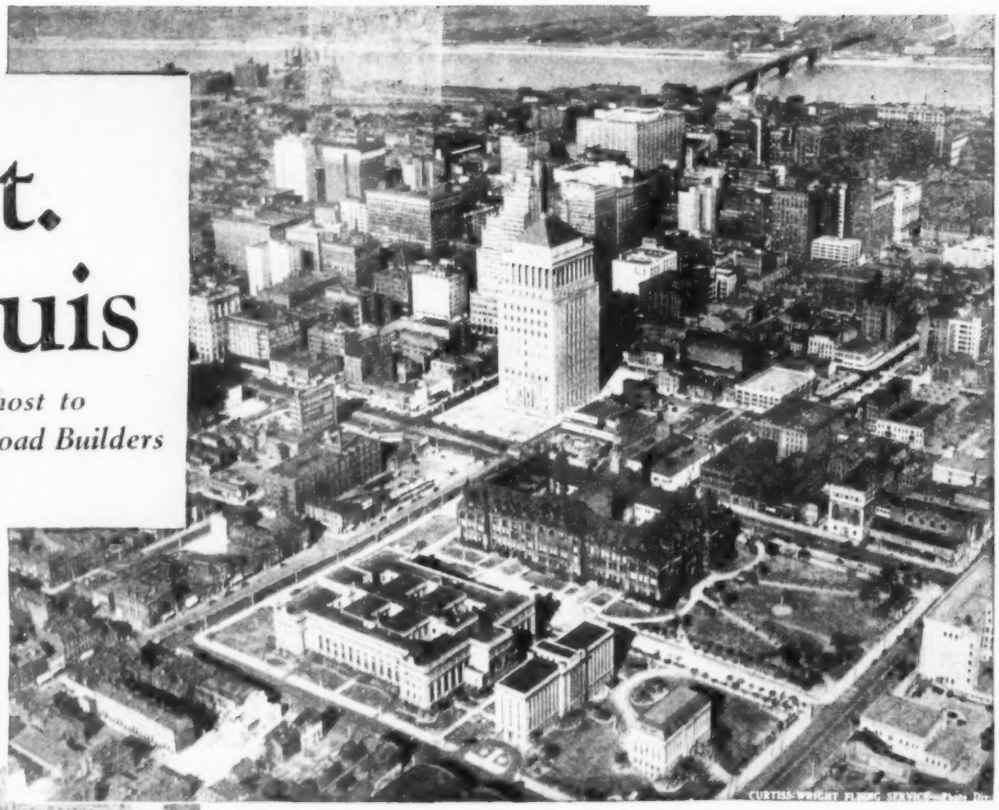
The American City

JAN 12 1931
PERIODICAL REPORTS

A Park in Downtown St. Louis — the Convention City This Month of the American Road Builders' Association

St. Louis

1931 host to American Road Builders



Air view of St. Louis, Mo.

Under the heavy traffic of Kingshighway, St. Louis, Mo.

TEXACO Asphalt pavement on Olive Street, one of St. Louis' main thoroughfares.

Lindell Boulevard, St. Louis, paved with TEXACO Asphalt.

over 500,000 square yards

The transfer of the Road Show from Atlantic City, N. J., to St. Louis, Mo., represents no change at all in one respect. It simply means a shift from one city with more than 500,000 square yards of TEXACO Asphalt paving to another city with over half-a-million square yards of TEXACO-paved streets.

Twenty-five of America's fifty foremost cities have upward of 500,000 square yards of streets paved with TEXACO Asphalt.

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The Texas Company
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In THE MUNICIPAL INDEX (an 850-page annual volume) readers will find much material, including articles, lists and bibliographies on a wide variety of municipal and civic subjects, not published in the monthly issues of THE AMERICAN CITY

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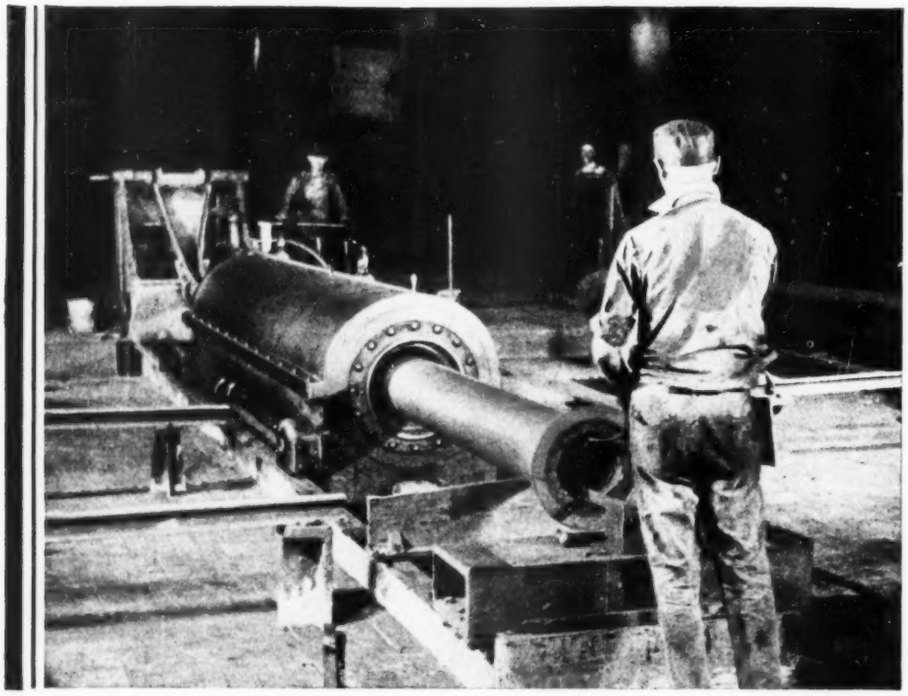

The illustration shows the deLavaud machine withdrawing to permit the removal of a newly formed pipe.

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WHY is deLavaud pipe the strongest cast iron pipe known? The answer can be found in the deLavaud machine shown above.

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Thus, upon close examination, you would find that deLavaud pipe metal is dense and fine-grained, free from gas bubbles and weakening impurities.

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In addition to making deLavaud pipe in accordance with U. S. government specifications, we are also furnishing this product in the various thicknesses and weights shown in the specifications of the American Water Works Association and the American Gas Association. Write for complete information.

United States Pipe and Foundry Co., Burlington, N. J.

Our pipe bears the "Q-Check" trademark of The Cast Iron Pipe Research Association

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

When you write for that catalog, kindly mention THE AMERICAN CITY

UNEMPLOYMENT RELIEF

and Items for Mayors and City Managers

Congress Covers the Bottom of the Dinner Pail; Why Not Fill It Full?

ENACTMENT by Congress, just before adjournment for the Christmas recess, of the $116,000,000 emergency construction bill and of the $45,000,000 drought relief bill, will mean a more hopeful new year for some thousands of our millions of unemployed. These are days when small favors are thankfully received; but for those who have hoped that the Federal Government would do something really courageous in the present emergency, the special appropriations thus far made for public works must be regarded as but a fraction of what ought to be, and may be, voted before final adjournment of the present Congress.

The President's fundamental attitude towards public works and unemployment relief cannot be doubted. It was reiterated on December 6 in a coast-to-coast radio broadcast in which Secretary of Commerce Lamont declared:

"President Hoover has always advocated the pushing of public and other large-scale construction programs as a corrective to periods of depression." But at about the same time the other side of the picture was voiced editorially in the December Bulletin of the Federal Council of Churches:

"One of the major disappointments of the present situation is the fact that long-range planning of public works, so widely endorsed by competent engineers and sponsored some years ago by Mr. Hoover himself, should not have been undertaken on a huge scale when the extent and growing seriousness of unemployment became manifest."

Apparently the two chief obstacles to the billion-dollar bond issue idea, advocated by the Emergency Committee for Federal Public Works (as outlined in THE AMERICAN CITY last month—pages 5 and 85) are:

1. Opposition of large taxpayers to a possible increase in the income tax rate.

2. Fear of waste in emergency public works expenditures.

As to the first, THE AMERICAN CITY believes that the moderate increase in the tax rate required for interest and amortization of a bond issue, would mean little, if any, burden on the great majority of corporations and individual taxpayers who would be enabled, through the stimulation of business and industry, to resume their normal activities and profits. Most Federal income taxes are paid, of course, not out of fixed incomes where every added tax dollar is an added burden; they are paid out of fluctuating incomes, where added taxes may be an actual benefit to the taxpayer because of added profits or regularity of employment which such taxes have stimulated.

The problem of possible waste in Federal expenditures was discussed briefly on this page last month. As there pointed out, THE AMERICAN CITY believes that, under the leadership of President Hoover and the Governors of the 48 states, the proposed emergency activities could be so organized as to produce permanent assets of great public value and with wastes far less than the losses which would result from the continued mental and physical anguish of our millions of unemployed or from the demoralizing effect of the acceptance of doles.

Mayors Urge Big Bond Issue for Federal Public Works

FIFTY-EIGHT mayors of the cities in the population group of 25,000 and over have notified the Emergency Committee for Federal Public Works of their agreement with the appeal to the President and Congress (as published on page 85 of this magazine last month) that the Federal Government authorize an immediate issue of "employment bonds" to an ultimate total of a billion dollars or more if necessary—the proceeds to be expended for needed public works in every state in the Union. The mayors who have authorized the signing of their names to this appeal, in order of the size of their respective cities, are:

Mayor	*City*
Harry A. Mackey	Philadelphia, Pa.
Frank Murphy	Detroit, Mich.
Victor J. Miller	St. Louis, Mo.
James F. Curley	Boston, Mass.
Daniel W. Hoan	Milwaukee, Wis.
Benjamin F. Stapleton	Denver, Colo.
Don C. McCombs	Kansas City, Kans.
Frederick W. Donnelly	Trenton, N. J.
Richard M. Russell	Cambridge, Mass.
J. Henry Stump	Reading, Pa.
J. Fred Manning	Lynn, Mass.
George A. Hoverter	Harrisburg, Pa.
Arthur E. Moreau	Manchester, N. H.
George A. Quigley	New Britain, Conn.
W. A. Gunter	Montgomery, Ala.
Thomas F. Donnelly	Covington, Ky.
W. O. Rigby	Topeka, Kans.
James Berg	Mount Vernon, N. Y.
S. E. Turner	Chester, Pa.
Robert Pfeifle	Bethlehem, Pa.
Thomas H. Gideon	Springfield, Mo.
William T. Dillon	Holyoke, Mass.
Walger G. C. Otto	New Rochelle, N. Y.
G. Glen Toole	Macon, Ga.
J. P. Barnes	Pittsfield, Mass.
William H. Gillespie	New Castle, Pa.
Franklin D. Lane	Phoenix, Ariz.
W. W. Graves	Stamford, Conn.
W. E. Van Drew	Williamsburg, Pa.
John J. Whalen	Chelsea, Mass.
William P. Penty	Battle Creek, Mich.
Walter Nelson, Jr.	Wichita Falls, Tex.
O. H. Brown	Council Bluffs, Ia.
Charles A. Patterson	Joplin, Mo.
W. A. Lynn	Warren, Ohio.
J. Tannier Kinnier	Lynchburg, Va.
Frank A. Jasper	Quincy, Ill.
Patrick J. Duane	Waltham, Mass.
W. H. Webster	Zanesville, Ohio.
S. S. Horn	Easton, Pa.
Victor L. Schaefer	Alameda, Calif.
Louis J. Yager	Waukegan, Ill.
W. P. Krau	Elkhart, Ind.
Harry M. Baker	Norwood, Ohio
W. A. Julian	Tucson, Ariz.
E. J. Phelps	Muskogee, Okla.
John B. Harris	Watertown, N. Y.
L. Don Jones	Marion, Ohio
Thomas Butler	Alton, Ill.
N. D. Martin	Everett, Wash.
W. C. Frailie	Ashland, Ky.
Max J. Mack	Galesburg, Ill.
B. W. Blanchard	Bangor, Maine
Ira J. Kreger	Wyandotte, Mich.
Edward W. Staebler	Ann Arbor, Maine
Elmer Martin	Bakersfield, Calif.
James A. Hewitt	Elyria, Ohio
W. B. Ellison	Johnson City, Tenn.

How Akron Saved $850,000 in Street Widening

THE outstanding city planning accomplishment in Akron during the past year, among several outlined by Mayor Weil in the above-mentioned report, is the widening of the two main east-and-west thoroughfares from the central business district to East Akron. The length of the portions of these two streets being widened is over four miles and the cost will be about $3,425,000, of which the city will pay 50 per cent from a bond issue voted in 1928. Buildings have been cut off or set back on most of the frontage, and more than a mile of widened roadways and new walks have been constructed. By reason of the building lines that were established ten years ago, Mayor Weil states that the cost of widening these two streets will be less by about $850,000 than it would have been if all buildings erected during the past ten years had been built out to the street lines.

Recent City Manager Appointments

GEORGE R. MOODEY was appointed City Manager of Painesville, Ohio, on November 17, 1930. He succeeds R. M. Evans, who resigned in October to become City Manager of Dubuque, Iowa.

J. P. Persons, a local resident, recently was appointed City Manager of Griffin, Ga. He succeeds E. P. Bridges, who served as City Manager since 1918.

D. J. Wyber has been appointed City Manager of Arvida, Quebec, succeeding H. R. Wake, who resigned to accept a position with a private company.

CLARENCE E. RIDLEY,
Executive Secretary, The International City Managers' Association.

Unemployment Relief

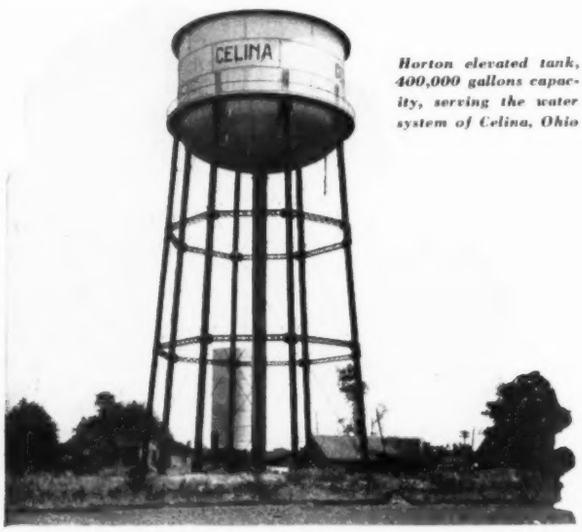
Other material on this pressing problem will be found on pages 108, 151, 160, 161 of this issue.

How a city of 72,000 benefited by large elevated storage ~ ~

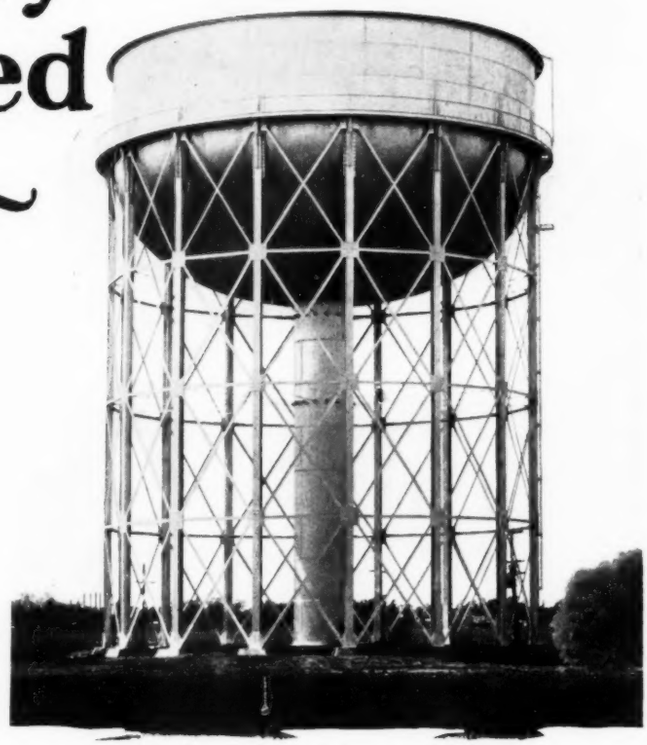
THE experience of cities of various sizes shows that the most economical and effective water supply usually includes elevated storage and the amount of this storage may often be larger than the population size might indicate.

In a city of 72,000, for instance, preliminary studies by a firm of engineers indicated four possible ways of improving the water system, at these costs:

	INVESTMENT REQUIRED	ANNUAL COST
1. Direct pumping	$763,340	$51,534
2. Existing reservoir with booster on north side of city	323,620	25,568
3. Surface storage with booster on south side of city	303,125	24,369
4. New system utilizing elevated storage	317,975	20,124



Horton elevated tank, 400,000 gallons capacity, serving the water system of Celina, Ohio



1,000,000-gallon Horton shallow-depth tank serving the city of 72,000 to which we have referred.

Since large elevated storage showed the lowest annual cost with reasonable first cost, a Horton shallow-depth elevated steel tank was installed, with highly satisfactory results. With this modern type of tank (shallow depth) there is little difference between high and low water level in the tank, thereby reducing pumping costs. ALL the water in the tank is delivered at effective pressure without excessive height to bottom.

We shall be glad to give you details of the above and other installations, and cooperate with your engineers in supplying estimates on tanks to fill their recommendations. Please address our nearest office.

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New York....3108 Hudson Ter. Bldg.
Cleveland...2236 Midland Bank Bldg.
Detroit.....1501 Lafayette Bldg.
Philadelphia.....1616 Jefferson Bldg.
Boston...1501 Consolidated Gas Bldg.
Birmingham.....1502 Fiftieth St., N.
Dallas.....3306 Magnolia Bldg.
San Francisco.....1033 Rialto Bldg.
Seattle.....4343 Smith Tower
Houston.....1101 Electric Bldg.
Tulsa.....2425 Exchange Bank Bldg.

HORTON TANKS

AC-1 Gray

Pure Water—Man's Greatest Need

Items on Water Supply and Purification

Water Mains of Wood 340 Years Old Found in Tokyo

WOODEN water mains 340 years old were recently dug up in Tokyo by a gang of workmen engaged in excavating for a modern sewer. Subsequent investigation showed that they had been laid by Tokugawa Ieyasu, first shogun or feudal lord to come to Tokyo to establish an independent capital. Yeddo, as Tokyo was then called, was nothing but a fishing village.

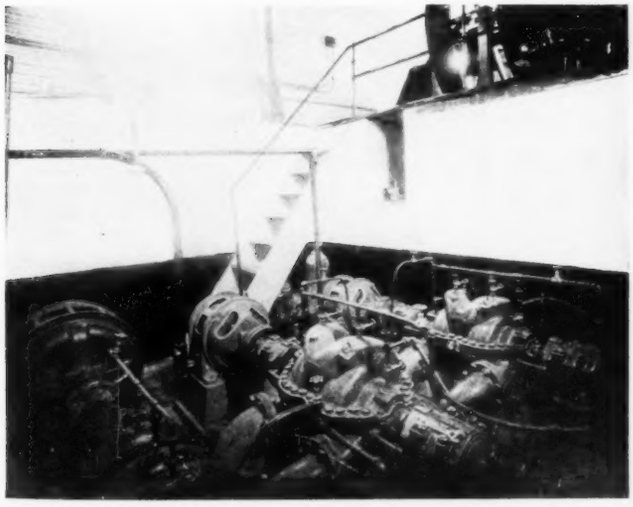
The shogun built his palace on the outskirts and installed all the modern conveniences of the time, among which were the rude water works which brought water from a river approximately 49 miles distant.

A Difficult Job in Cutting-in New Pumps

THE accompanying illustration shows two new 3 x 10-inch, 4-stage, BJ, multiplex pumps installed by St. Maries, Idaho. In the foreground is an old-style BJ-4-inch, 3-stage, series pump which was purchased by the city in 1915. After 15 years of service the old pump performed as well as ever, both mechanically and hydraulically, but, pumping conditions in the town of St. Maries being somewhat altered, the old unit with a 75-horsepower motor did not prove to be the most economical equipment for the city. Accordingly, the two new pumps, one with a 25-horsepower and the other with a 30-horsepower motor, were installed. It was figured that either one of them, operating the major portion of the time, could take care of the city's needs and keep its power bills down by operating a smaller motor with a higher load factor.

As the city was absolutely dependent upon the supply of water furnished by the old Byron Jackson pump, it was necessary to arrange a hook-up whereby the two new pumps could be installed, taking their suction from the same line as the old one, and discharging also into the same discharge as the older pump without more than a few hours shutdown. This arrangement was accomplished, and now that the new pumps are installed and operating, the motor will be removed from the old pump, and a pulley which was furnished with the original order will be mounted on the present baseplate, so that the old diesel engine, shown in the upper right-hand corner of the picture, may be used as a standby in case of power shortage. By this means, it is anticipated, a material reduction in insurance rates for the city will be realized which will in itself almost pay for the new pumps.

JOHN M. DAWSON,
Water Works Superintendent, St. Maries, Idaho.



INTERIOR OF THE WATER WORKS PUMPING STATION AT ST. MARIES, IDAHO

Preventing Waste of Water

SHORTAGE of water always means a serious inconvenience, and many serious epidemics of typhoid fever and intestinal disorders have resulted from temporary use of polluted water from sources other than the usual ones in emergencies. When it becomes necessary to draw from a questionable auxiliary supply, the danger can be largely averted, if the pollution is not too great, through the disinfection of the polluted water with chlorine at a comparatively small expense.

As an additional safeguard, one of the regulations of the New York State Sanitary Code requires every water company or board, excepting in cities of the first class, to notify the local health officer and give him an opportunity to be heard before making use of any auxiliary supply or making any change which may affect the sanitary quality of the public water supply. He, in turn, is required to notify the State Health Department by telephone or telegram. The State Department has an emergency chlorinating apparatus which is frequently installed to help out while the equipment is being prepared.

Water consumers themselves can do a great deal, however, to prevent water famines. An immense amount of water is often lost through leakage. If the leaks are in the mains, the responsibility for finding and stopping them rests with the water company or officials, but a great deal of water may also be lost through the continuous dripping from a leaky faucet or through a leaky valve in a bathroom flush tank.

When it is known that the public supply is getting low, every consumer should consider it a duty to economize in every possible way in the use of water. The lawn will probably survive if it is sprinkled less often and less freely, faucets should not be left open, and it will even be found possible to use less water in the washing machine. In industrial plants and office buildings, it is often possible to economize in the use of water for running machinery and elevators. With a large number of consumers cooperating, hundreds and thousands of gallons can be saved.

Finally, it is hardly necessary to say that where water shortage can be foreseen, the responsible officials should not wait until the emergency arises to make provisions for a properly protected auxiliary supply. If this cannot be done, then it is high time that the community began to look around for a new supply which will be both safe and adequate in quantity.

C. A. HOLMQUIST,
Director, Division of Sanitation, N. Y. State Department of Health.

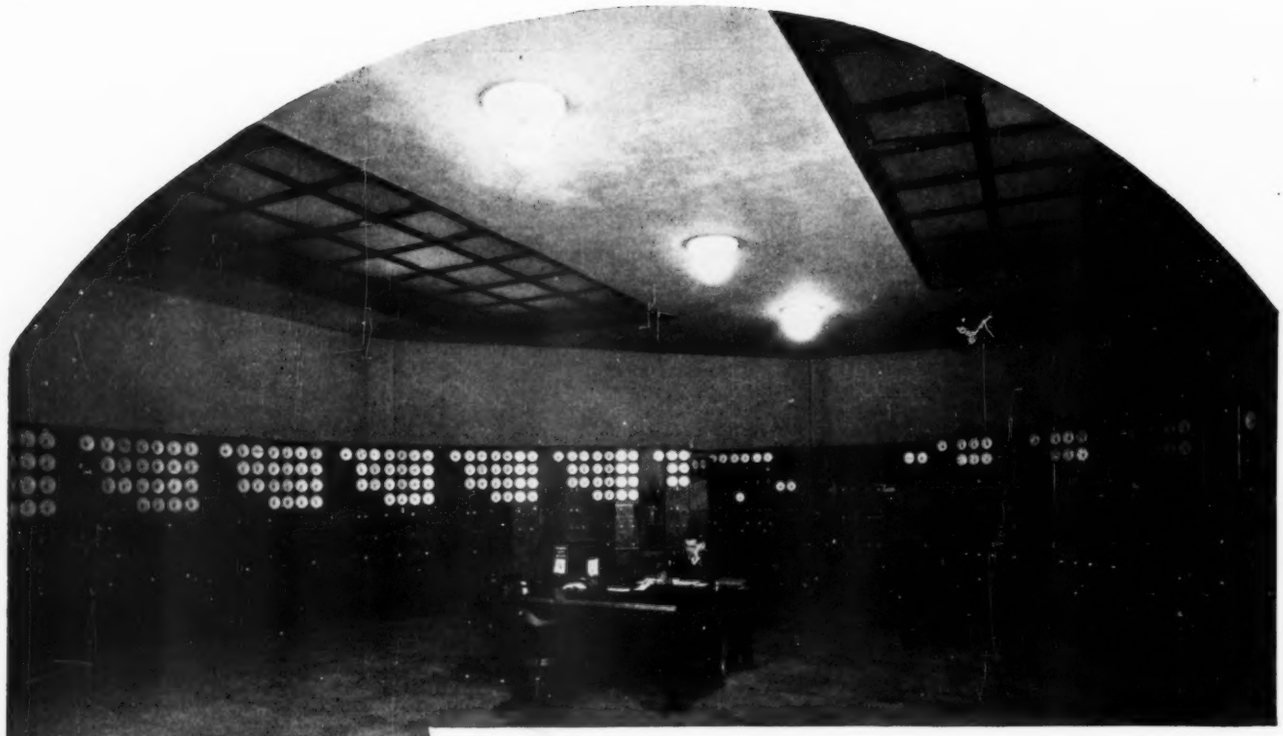
Water-Softening Plant at Westerville, Ohio

WESTERVILLE is a community of about 3,500. In 1924, a water-softening plant was constructed, using Alum Creek as the principal source of supply, with an emergency supply from wells. This plant was built at a cost of $49,000 and consists of dry feed lime-soda and alum machines, two mechanical mixing chambers, two coagulation basins, two filters of 300,000 g.p.d. each and a clear well. Low- and high-service pumps are electric-driven centrifugals. They are in duplicate. A 200,000-gallon elevated tank provides uniform pressure on the system. Hardness of the raw water averages about 300 p.p.m. and the softened water about 90 p.p.m.

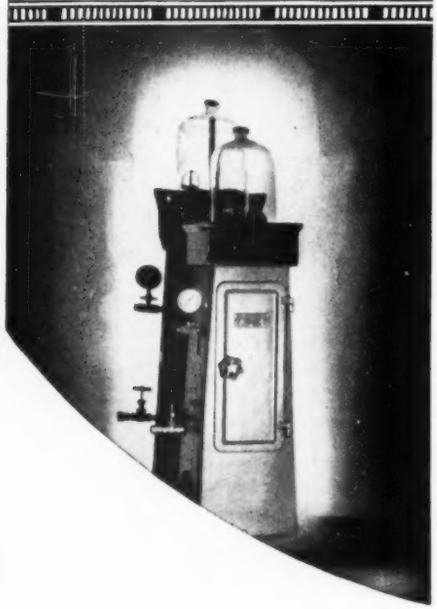
The cost of chemicals for softening and coagulation averages about $28 per million gallons.

There are 800 domestic and 110 industrial services, all of which are metered. The charge for water is $2.50 per 1,000 cubic feet up to 15,000 cubic feet per quarter, with a discount of 10 per cent for prompt payment. Above 15,000 cubic feet the charge is $1.75 with no discount. The minimum charge is $2 per quarter.

—From a paper by J. H. Wenger, Superintendent of Filtration at Westerville, Ohio, read before the Ohio Conference on Water Purification.



DOLLARS at stake dictate the use of these elaborate control devices on the 452,000 H. P. output of the Niagara Power Plant



CONTROL—

THE ESSENCE OF

CHLORINATION

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Appreciation of this responsibility has prompted the installation of over 3000 W&T Vacuum Chlorinators to date. Their accurate control—their unquestioned dependability are a byword in fields of Public Health and Sanitation.

Radically different in principle, the hydrostatic vacuum does the work of troublesome chlorine pressure reducing devices and check valves, W&T Vacuum chlorinators are trouble free chlorinators.

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Branches in principal cities

"The only safe water is a sterilized water"

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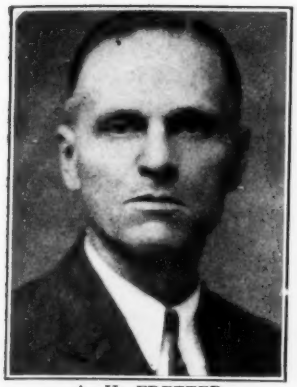
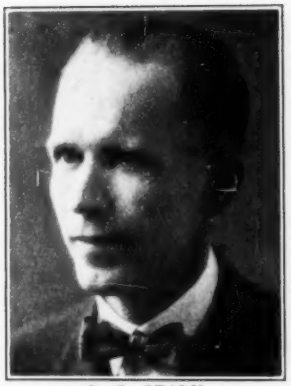


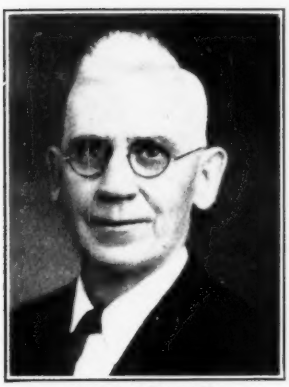
A. H. FRETTER
Supt. of Water
Medina, Ohio
(Appointed 1919)

FRANK L. DROUILLARD
Water Commissioner
Ecorse, Mich.
(Appointed 1909)



O. G. SEALY
Comsr., Public Works
Western Springs, Ill.
(Appointed 1926)

HOMER H. SARGENT
Supt., Public Works
Sycamore, Ill.
(Appointed 1917)

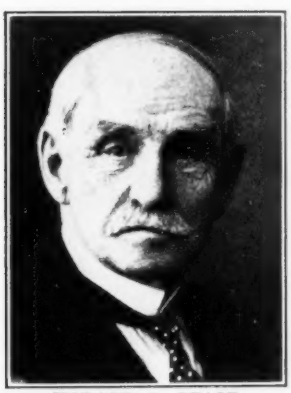


MARK LEETCH
Supt., Water Works
Belding, Mich.
(Appointed 1923)

Who's Who in Water Supply

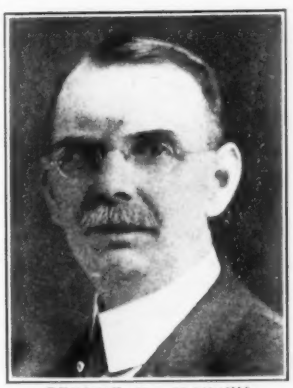
The 37th of a Series of Portraits of Water Works Officials Wich Has Appeared Monthly Since January, 1928

DONALD W. FOSTER
Supt., Water Dept.
Wilmington, Mass.
(Appointed 1928)



HORACE C. PEASE
Gen. Mgr., White River Water Co.
Hartford, Vt.
(Appointed 1924)

C. F. LATHROP
Supt., Water Works
Rochelle, Ill.
(Appointed 1911)



GEORGE W. MASSEY
Supt., Lambertville Water Co.
Lambertville, N. J.
(Appointed 1910)

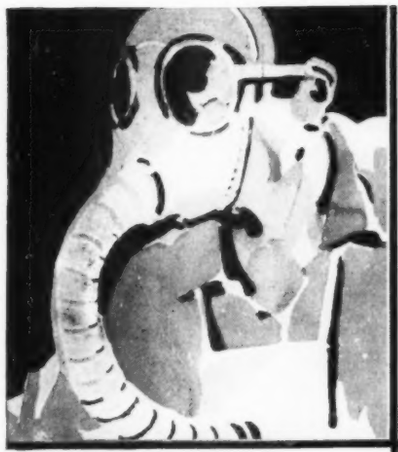
CHARLES E. ROHR
Comsr., Water Dept.
Naperville, Ill.
(Appointed 1927)

J. W. FAUBER
Supt., Water Works
Roanoke, Ill.
(Appointed 1920)

WILLIAM T. BAYLEY
Supt., Water Works
Lockport, Ill.
(Appointed 1927)

FRED J. ANIBLE
Supt., Water Works
East Grand Rapids, Mich.
(Appointed 1930)

WORTHY WHITE
Mgr., Foot Hill Dist., American States Water Service Co. of Calif.
Claremont, Calif.
(Appointed 1928)



Need a gas mask ? *Never!*

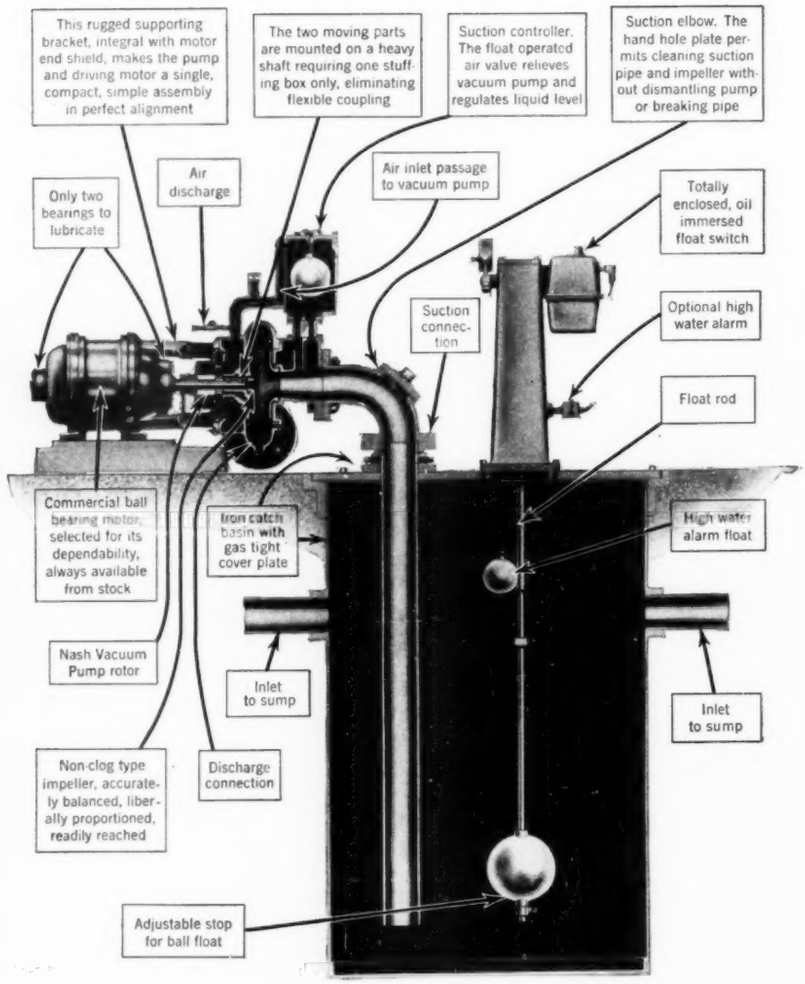
Install a Jennings Sewage Pump which is located out in the open, above the pit . . .

HERE is a sewage pump that is easy to take care of. Installed entirely out of the pit, pump, driving motor and controls are always accessible

Nothing is submerged except the suction pipe. The interior of the pump can be laid open, and the impeller removed for inspection and cleaning, without even going near the pit.

Jennings Suction Sewage Pumps are furnished in sizes and capacities to meet all of the usual requirements. Heads up to 75 ft. Write for Bulletins 113 and 124.

NASH ENGINEERING CO.
14 Wilson Road
SOUTH NORWALK, CONN.


This rugged supporting bracket, integral with motor end shield, makes the pump and driving motor a single, compact, simple assembly in perfect alignment
The two moving parts are mounted on a heavy shaft requiring one stuffing box only, eliminating flexible coupling
Suction controller. The float operated air valve relieves vacuum pump and regulates liquid level
Suction elbow. The hand hole plate permits cleaning suction pipe and impeller without dismantling pump or breaking pipe
Only two bearings to lubricate
Air discharge
Air inlet passage to vacuum pump
Totally enclosed, oil immersed float switch
Suction connection
Optional high water alarm
Float rod
Commercial ball bearing motor, selected for its dependability, always available from stock
Iron catch basin with gas tight cover plate
High water alarm float
Nash Vacuum Pump rotor
Inlet to sump
Inlet to sump
Non-clog type impeller, accurately balanced, liberally proportioned, readily reached
Discharge connection
Adjustable stop for ball float

Jennings SUCTION SEWAGE *Pumps*

Sewage Treatment Means Clean Streams

SEWERAGE and SEWAGE DISPOSAL

Gaging the Sewage Flow in Buffalo

IN common with many lake cities, Buffalo, N. Y., is a liberal user of water. In 1905, the total pumpage at the city water-works was at the rate of nearly 400 gallons per capita daily. Today the consumption is at the rate of 209 gallons per capita daily, this marked reduction being the result of a continued program of waste surveys and the extension of metering. Of the total water consumption about 6 per cent is taken by the railroads. An additional 38 per cent is divided between large industries and commercial users. Strictly domestic use of water is approximately 70 gallons per capita daily, which amounts to about one-third of the total pumpage. It may be of interest to note that while industrial and commercial use of water may run from 12,000 or 13,000 to 30,000 gallons per acre daily, there is a decided risk in the universal application of such average units. For example, certain subdivisions of area have been found to yield probable discharge of sewage up to rates of 300,000 gallons daily per acre of area. Laundries and large hotels, together with dairies, are found to be among the largest consistent users of water.

In Buffalo, there has been an attempt to gage some of the sewers. The results do not lead to establishing any strictly universal units of flow. In fact, they very clearly show the difficulties in applying any such general units. The make-up of the area and its topography are found to have a marked influence, particularly upon the industrial and infiltration units of flow. This fact may be unimportant from the standpoint of a sewage treatment plant, but it does have a distinct bearing in the design of intercepting sewers. There is also indication that, in some cases at least, it is necessary to make allowances for surface run-off from former streams which have been enclosed. In Buffalo, the sewage flow seems to range between 125 and 600 gallons per capita daily. These units, of course, apply to combined sewers and represent dry-weather flow. The average sewage flow for the whole city is apparently quite close to the average water consumption.

C. L. HOWELL,
Assistant City Engineer.

Public Sewerage Systems in Missouri

MUNICIPAL sewage and industrial waste treatment and disposal is necessarily closely linked with the protection of public water supplies and the pollution of rivers and streams with resultant nuisance as well as destruction of fish life. This whole problem is annually demanding more attention in Missouri due to additional municipal sewerage systems, increasing number of industrial establishments and a growing realization that our streams are a valuable asset that must not be destroyed as such through gross pollution. On the other hand, sanitary sewerage systems are fundamental essentials to satisfactory municipal sanitation and on this ground their number and increased use is justifiably encouraged. Likewise, essential industries, frequently with difficult wastes to dispose of, are necessary to the prosperity of the state. An increasing number of sewered towns and profitable industries must be encouraged, and it is paramount that simultaneously ways and means must be developed for the successful and satisfactory disposal and treatment of the wastes from both, to assure a reasonably adequate protection of the state's rivers and streams.

To meet this problem, the State Board of Health of Missouri has developed a program which, in a limited way, is providing as satisfactory a solution to the difficulties encountered as is possible until needed legislation and funds are provided for organizing an adequate body to supervise the water resources of the state. It consists in the approval of plans and specifications for, and final inspection of, new sewage works; annual supervision of the operation of existing sewage-treatment works, followed by recommendations relative to required changes in construction and operation; promotion of new sewer systems and adequate sewage treatment; and special investigations of unusual problems in industrial waste and sewage treatment, as well as limited stream pollution studies.

During 1929 plans were approved for the construction of 12 new sewerage systems. Two systems were completed and final inspections made and surveys were made of 114 existing municipal systems with particular attention to conditions and operation of the 84 sewage-treatment plants. These surveys were followed by reports or letters indicating defects in construction and operation which should be remedied. In 9 cases special investigations were undertaken to determine the cause for unsatisfactory operation of the plants and the remedy for difficulties arising in operation, such as foaming, odor control, etc. These investigations necessitated transporting a laboratory to the plant and careful laboratory control for a considerable period of time. Frequently, local operators were trained to make the simple tests with equipment provided by the city.

Upon request, sanitary surveys were made of cities without sewerage systems for the purpose of demonstrating the dangers to public health involved. Reports of these surveys and recommendations were submitted, as well as a number of talks before mass meetings called to consider the problem. Literature on the advantages of a sewerage system and a movie film showing the dangers from insanitary conditions were provided upon request to those cities considering the construction of a sewerage system.

From time to time the Division has been called upon to make investigation of conditions constituting pollution of rivers and streams either from city sewage or industrial wastes. These occurrences are becoming more frequent each year and demand additional personnel and funds to cope with the problems in a satisfactory manner.

—From the last Annual Report of W. Scott Johnson, Chief Public Health Engineer, Division of Public Health and Engineering and Sanitation, Missouri State Board of Health.

Screenings Burned with Gas Collected at San Angelo

FOR a number of years the screenings from the sewage-disposal plant at San Angelo, Texas, were disposed of by burying in a plat of ground adjacent to the disposal-plant site. This method was not satisfactory, as it proved to be a nuisance and also it was not an economical method of disposal.

The sewage plant is of the Imhoff-tank and sprinkling-filter type and takes care of about 1,000,000 gallons per day for a population of about 18,000. The gas vents on the Imhoff tank are covered and a system of pipes is arranged for collecting the gas, which is now being utilized to burn the screenings from the plant.

The screenings are placed in an open furnace that has a grate and also a solid plate or, in other words, the furnace is a 3-story apparatus. The pipes and valves are so arranged that the gas from the Imhoff tank can be turned into the compartment of the furnace that will give the best results for the kind of screenings to be disposed of. The screenings from the coarse screens burn best on the grate while the screenings and oil that are skimmed from the flow chamber of the Imhoff tank will burn only on the solid plate.

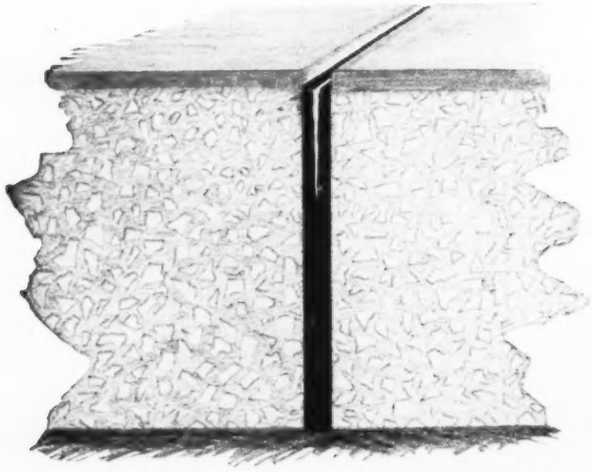
The grate and the solid plate in the furnace burn out in about 6 months time and because of this the furnace was designed and built so that it will take only about 2 minutes to change either or both plates.

The wet screenings are taken directly from the coarse screens and placed in the furnace. It requires about three hours for the furnace-full of screenings to dry and burn.

So far there has been no nuisance from smoke or odors, but, in case of any nuisance developing, the furnace is so arranged that it can be closed and a stack placed on it to take care of smoke or odors.

J. P. BURDEN,
City Engineer.

BETTER EXPANSION JOINTS



BASE FILL OF THE PERFECT POURED JOINT

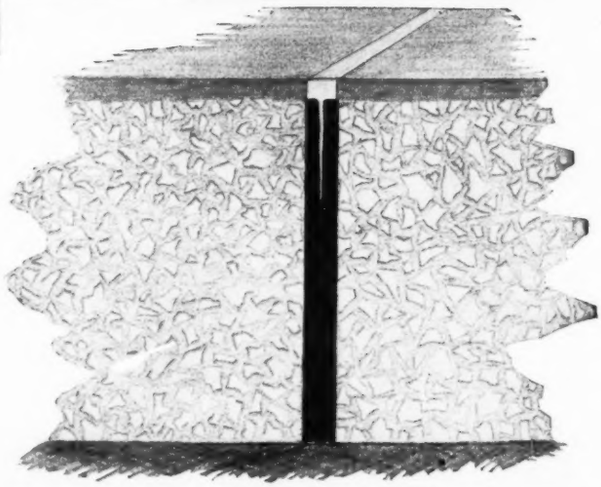
The cross-section view at the left shows a joint or crevice base fill with—cold poured—SERVICISED LIQUID RUBBER ASPHALT—a tough elastic filling—non-oozing in nature, which sets to a leathery mass.

THE PERFECT POURED JOINT

The cross-section view to the right shows the Perfect Poured joint or crevice fill—note the top finish filler—

SERVICISED GRAY FILLER

poured cold or hot from emulsified or solid form as desired—removes the unsightly black lines from paving and makes a better expansion joint. Write for full particulars.



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Asphalt Planks
Rail Filler
Asphalt Tile
Rubber Block
Expansion Joints
Asphalt Emulsions
Colored Emulsions
Cable Trunking

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Construction and Maintenance

Engineering and Highway Departments

Creosoted Bridge Deck Carries Heavy Traffic Without Maintenance

IN 1923 extensive repairs were necessary on the Newton Street viaduct in New Orleans, La., and after thorough investigation, a laminated deck, built up of 2 x 4-inch creosoted strips, was decided upon. The structure is a fabricated steel viaduct crossing the Southern Pacific Railroad yards at Algiers, within the corporate limits of the city of New Orleans. The repairs entailed complete renewal of some of the plate girders in the central part of the viaduct, floor beams, roadway, pedestrian walkways, and street-railway track, and the concreting of column bases, made necessary because of corrosion. It was agreed that the deterioration of these steel members was caused by oxidation resulting from the action of locomotive exhaust gases from passing trains and especially severe climatic conditions, including heavy annual rainfall, semi-tropical heat and the constant presence of salt-laden breezes from the adjacent Gulf Coast.

The viaduct is 1,497 feet long, of which 1,080 feet form the two approach ramps, located at either end of the 417-foot stretch of plate girder construction. The approaches form an easy gradient to the over-track portion of the structure. An 18-foot roadway is provided, as well as a 6-foot sidewalk and one line of standard-gage street-railway track. On top of the steel stringers 2 x 4's under the sidewalk section, and 4 x 4's under the vehicle lanes, are used for nailing strips. All hardware was galvanized and the nailing strips were secured in place by bolting to the flanges at 3-foot intervals, the bolt heads being countersunk to secure an even base. The main roadway decking consists of 2 x 4's placed on edge, securely spiked together and toe-nailed to the nailing strips. About 146,380 board feet of creosoted southern pine were utilized in the 1,080 feet of approach spans, and 48,060 feet in the 417-foot plate girder spans, a total of 194,440 board feet. All of this material was treated with grade one coal-tar creosote by an empty cell process, with a final retention of 8 pounds per cubic foot. So far as possible, all timbers were cut to size and framed before treatment, but where necessary to cut any member for final placement in the structure, the specifications provided that the cut portions be painted with a heavy coat of standard coal-tar creosote. The timbers specified were square-edge and sound, dense southern yellow pine, according to the grading rules of the Southern Pine Association.

The roadway decking was built up of 2 x 4-inch creosoted southern yellow pine timbers dressed on one side and one edge. These were cut to the exact length and laid at 90 degrees to the longitudinal axis of the structure, each timber being toe-nailed to each nailing strip with at least two galvanized 20d wire nails. Each timber was drawn up tightly against its adjacent member, leaving no open joints between timbers and furnishing a solid 4-inch floor. An allowable variation of ⅛-inch in the 4-inch dimension was permitted, and a maximum difference of ¼-inch in the depth of the flooring strips was allowed. The resulting irregular top surface provided a good mechanical bond for the rock asphalt wearing surface.

When this floor was laid, in 1923, a ¾-inch wearing surface was laid between wheel-guards. An additional ¾-inch of similar topping material was placed on the north side in the late summer of 1928 in order to provide better drainage on the center 417-foot plate girder section, upon which the grade is flat.

In a recent conference, John Klorer, who was City Engineer of New Orleans at the time of the rehabilitation of the viaduct, expressed entire satisfaction with the maintenance record of this decking. He said that his experience had indicated that the life of untreated and unprotected bridge flooring material on the numerous city bridges of both fixed and bascule lift types averages about 19 months. This floor has now been in service seven years and no maintenance expense has been charged against it during that period.

The bridge is on the main approach highway connecting New Orleans and the U. S. Naval Station and is a part of the main highway on the west or right bank of the Mississippi River.

BRYSON VALLAS,
City Engineer.

Do You Handle Road Building This Way?

THERE are many counties in the United States whose highway departments are well organized and which get the maximum return for each tax dollar spent. Apparently such is not the case in a county in one of the Mid-Western states, for a local newspaper undertook an investigation of the County Road Department and published a series of six articles on conditions unearthed in the three months' investigation. Among the specific conditions disclosed, we list but a few, hoping that other counties will check their organization and operating conditions with these as a "bad example."

"More than $8,000,000 spent in twelve years without a foot of permanent road.

"A surplus of $120,000 converted into a deficit of $241,000 in seven years.

"An expensively maintained rock quarry paralleled by purchases of rock from outsiders.

"Antiquated bookkeeping and accounting methods that conceal more than they reveal.

"A future road program that declines to consider the construction of permanent roads.

"A persistent refusal to accept Federal and state aid in new construction.

"Forty-five per cent of every county dollar for twelve years has been spent by this department, with a long record for wastefulness, extravagance and guesswork, for which fiscal courts have been and are responsible."

Calcium Chloride Used to Make Cinders Stick on Slippery Highways

CALCIUM chloride is being used in connection with sand or cinders in lessening the hazard on icy and slippery places on Minnesota trunk highways. Sand or cinders thus treated will imbed themselves in the ice, while dry sand or cinders strewn over the ice will often be swept away by passing cars.

For the information of others who may want to try the same method, the formula is given here: Make a solution of 100 pounds of calcium chloride to 13 gallons of water, using enough of this solution to saturate the storage pile of sand or cinders. Stronger solutions may cause damage to pavements.

The highway maintenance crews sand or cinder slippery stretches of highways, as far as time permits giving special attention to hills, turns, intersections, and other hazardous places. Sometimes, however, sleet will make all highways icy and slippery, and then it is obviously impossible to cover all of them at once. At such times the only safe way is to drive very slowly and carefully, and in extreme cases postpone the trip.

W. F. ROSENWALD,
Maintenance Engineer, State Department of Highways, St. Paul, Minn.

Rubber Block Paving on a New Jersey Bridge

A RUBBER block pavement has been placed on a small bridge at the lower end of Market Street, Passaic, N. J., over the Dundee Canal. The pavement consists of an 8-inch octagonal block ¾-inch thick, with seven ½-inch lugs on the bottom of the block. The face of the block is corrugated to prevent skidding. The rubber blocks are set in 3 inches of mortar, and the edge of each block is painted with a rubber cement. This experimental bridge floor, made by the United States Rubber Co., was laid under the direction of Garwood Ferguson, County Engineer of Passaic County.

WILLIAM H. FLOYD,
Assistant County Engineer, Passaic County, Paterson, N. J.

An 8-Year Record of Economical Performance

NOW completing its eighth year of operation, the Morse Boulger Destructor Plant at Greensburg, Pa., has proved its value in service.

Greensburg can be considered typical of many small cities, having a population of approximately 16,400.

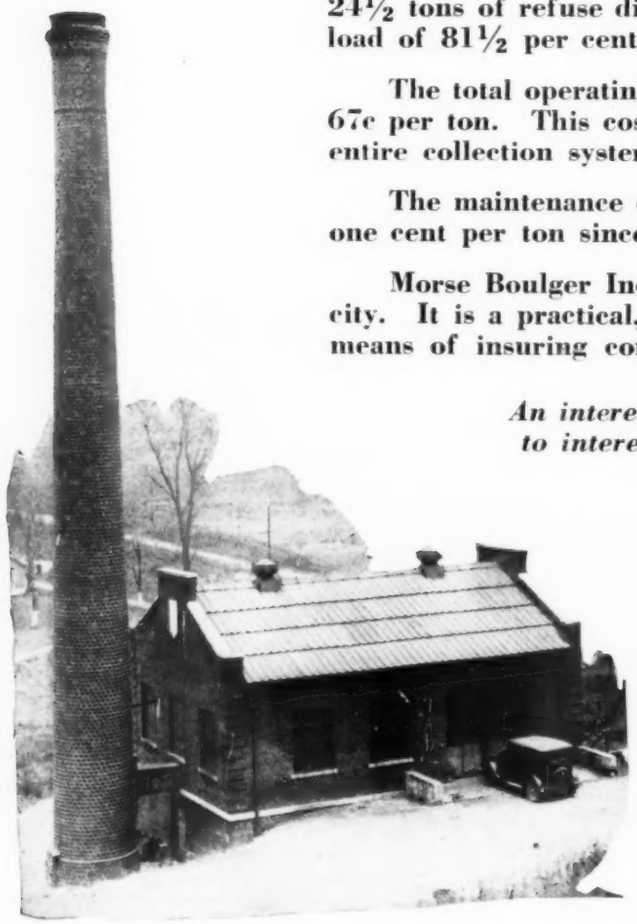
The plant has a rated capacity of 40 tons in twenty-four hours, provided by two Morse Boulger Units. In 1929, 7,370 tons of refuse were disposed of. The plant operated on an eight-hour day schedule which resulted in an average of 24½ tons of refuse disposed of per 8-hour day, or an overload of 81½ per cent above rated capacity.

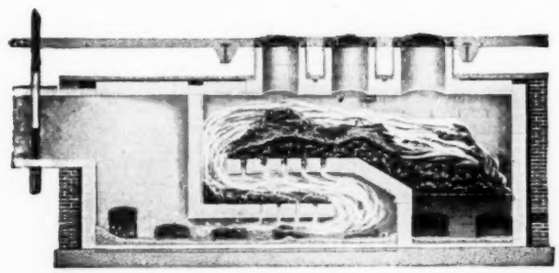
The total operating cost amounted to $4925.60 or about 67c per ton. This cost also included the supervision of the entire collection system.

The maintenance cost has been extremely low, less than one cent per ton since the plant was installed.

Morse Boulger Incineration is not a luxury for a small city. It is a practical, economical and almost indispensable means of insuring community health and cleanliness.

An interesting booklet will be sent to interested municipal officials.





HEAVY-DUTY INCINERATION
MORSE BOULGER DESTRUCTORS

MORSE BOULGER DESTRUCTOR CO., INC.
205-C East 42nd Street, New York City

OTTO S. HESS
Engr.-Mgr., Kent County Road Commission, Grand Rapids, Mich.

HAROLD S. POWELL
Highway Engineer
Wakefield, Mass.

LOUIS FRANK LEVIN
County Highway Engr., Chippewa Co., Sault Ste. Marie, Mich.

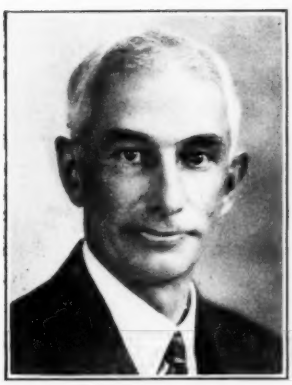
HAROLD H. EVERETT
City Engineer
Mansfield, Mass.

PAUL S. ISRAELSON
County Road Supt., Dickinson Co.
Iron Mountain, Mich.

Who's Who in City & County Engineering

One of a Series of Portraits of Engineering Officials Which Has Appeared Monthly Since April, 1928

W. H. RIEHL
City Engineer
Stratford, Ont.

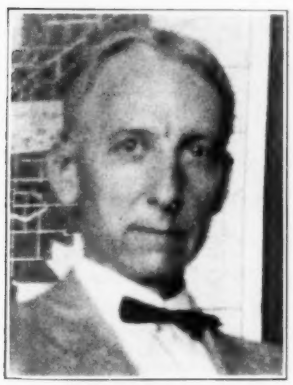


A. R. BAILEY
Engr.-Mgr., Washtenaw Co. Rd. Commission, Ann Arbor, Mich.

MARK B. OWEN
Supt., Dept. Public Works and Engineering, Dearborn, Mich.

SEYMOUR JUSTEMA
County Engr., Menominee Co., Menominee, Mich.

LEON LUKE
County Engr., Macomb Co.
Mt. Clemens, Mich.



W. H. WINSHIP
Street Commissioner
Indianapolis, Ind.

C. RICKSECKER
Supt. of Streets
Beloit, Wis.

WM. R. McMENIMEN
Supt. of Streets
Cambridge, Mass.

WALTER O. DOW
County Engr., Grand Traverse Co., Traverse City, Mich.

Announcing a New and Vastly Improved

AMERICAN CHAIN LINK

STEEL WIRE TENNIS NET

(Patent Applied For)

Further Evidence of Its Practicability

Many letters have been quoted in our advertising in the past few months. Here are additional letters:

"It gives us much pleasure and satisfaction," writes the Park Superintendent of a city in Iowa, "to advise you that the six tennis nets purchased from you have fulfilled our every expectation.

"Their rugged construction and consequent freedom from requiring repairs makes them highly desirable from an economic standpoint.

"We have received many compliments on the excellent condition of our courts and we attribute this largely to the use of your nets and strongly recommend same to anyone needing such equipment."

The Mayor of an Ohio city writes: "I have heard no complaints, but have heard some favorable expressions . . . so that I plan to make additional installations by next year's tennis season."

The Purchasing Agent in one of California's most prominent cities wrote us: "Our Superintendent of Parks states that the nets have been very satisfactory to the players and he feels assured that they will prove to be economical in use. We will undoubtedly standardize on this type of net."

From a well known preparatory school in Indiana: "We have no criticisms to offer with reference to this net . . . in fact it has served its purpose very well, and while the initial cost is somewhat higher than the cotton net, there should be very little expense as far as renewal or upkeep is concerned."

Six months ago this revolutionary improvement in tennis nets was introduced. Scores of installations have been made . . . in more than 23 states . . . *without a single instance of dissatisfaction.*

Officials of public parks, playgrounds and schools have written us many letters . . . expressing their conviction that the American Chain Link Tennis Net was the most economical and practical net ever devised for use upon public courts.

Many municipalities which made trial installations of a half-dozen nets last year have since equipped all of their courts with our net, or have signified their intention to do so this Spring.

A number of very practical improvements have been incorporated into the American Chain Link Tennis Net since it was first introduced.

The new net has won the approval and endorsement of some of this country's keenest and most critical authorities . . . both on tennis itself and upon the operation of public park tennis courts.

It will pay you . . . if you are concerned with the operation and maintenance of tennis courts in public parks, playgrounds or schools . . . to investigate this revolutionary steel wire tennis net. Do so! Write us at once for complete information.

American Wire Fence Company
Tennis Net Division
7 South Dearborn Street **Chicago, Illinois**

A Few of the Many Installations

Public Parks

Ala., Birmingham
Cal., Alameda
Berkeley
Los Angeles
Pasadena
Sacramento
Fla., Tallahassee
Tampa
Vero Beach
Ill., Chicago
Lombard
Moline
Iowa, Clinton
Md., Baltimore
Mass., Reading
Salem
Minn., Minneapolis
Mo., St. Joseph
N. Y., Niagara Falls
Ohio, Lakewood
Okla., Oklahoma City
Ore., Portland
S. D., Mitchell
Texas, Austin
Houston

Schools and Colleges

Connecticut College, Connecticut
University of Georgia, Athens, Ga.
Rosary College, River Forest, Ill.
Culver Military Academy, Culver, Ind.
Dana Hall School, Wellesley, Mass.
Allegheny College, Meadville, Pa.
State College, South Dakota
State College, Pullman, Wash.

Scores of other installations have been made during the past six months . . . by public parks, playgrounds and schools; tennis clubs; golf clubs; country clubs and private estates. Not one single case of dissatisfaction has arisen to date. Think of it!

"Our Best Playground Idea"

Carried Out in 1930

A General Expansion Program

IN the summer of 1929, Reading, Pa., had 18 unsightly, hot and dusty playgrounds; no swimming pools, and yet a local newspaper head described the drowning of four boys in one day in the Schuylkill River, which flows through the city in an inky condition from the coal mines; there were no wading pools on any of the unshaded playgrounds; no playgrounds had tennis courts, although the city operates a few in the three small parks; and, last but not least, only one school gymnasium was being used for recreational purposes during the winter season. We realized that an especial effort must be made to organize the community for action. This is the way we put our idea over:

After an intensive educational publicity campaign and after securing the interest of the city administration and the School Board, in one year's time four new playgrounds were acquired and two of the old areas were graded, fenced with chain-link wire, beautified with trees, and sodded, and a sprinkling system was installed. Seven new 36-foot wading pools were built, with shower attachments, and thousands of children used these facilities. Eleven new tennis courts were built on playgrounds, and more interest than ever was displayed by youngsters in the game. Because of the campaign for swimming pools, a local newspaper started a swimming-pool fund by popular subscription and built a $75,000 swimming pool in the most congested neighborhood in the city. An average of 1,200 children used the new pool daily. More swimming pools now will be built.

With the organization of 8 leagues of industrial boys' basketball (64 teams), the School Board was asked for the use of 11 gymnasiums, and consented.

After another educational- publicity campaign for the wider use of school buildings for community centers, the local Junior League said it would finance the first community center. The School Board granted the use of a new grade school in a foreign neighborhood, and the first community center in a school building opened with an enrollment of 1,215 persons.

THOMAS W. LANTZ,
Superintendent, Public Recreation, Reading, Pa.

Outdoor Life for All

RIDING is coming back, and the Park Board in Boulder, Colo., recognizing this, has recently completed a bridle-path which runs along Boulder Creek through the center of the city, and then winds up Flagstaff Mountain, swings to the south over the mesas and leads past Chautauqua Park and the University campus back to the starting point, a circle of five miles. This trail fords the creek, crosses several canons, and avoids the streets, making a delightful ride.

The Park Board has also undertaken to encourage winter sports. Only for a month or two is there any snow, but advantage is taken of that short time. One can go to the high ranges west of Boulder and find Arctic conditions from October to May, but it is not safe for youngsters there. So streets in various parts of the city are set aside for coasting when the snow is right, with guards at each crossing. These streets are steep enough to afford good coasting, but yet are not so steep as to be dangerous. Several new skating ponds have also been prepared. Boulder is lacking in skating facilities, with no bodies of water except irrigation reservoirs some miles east out on the plains; so some small abandoned reservoirs will be flooded, one on newly acquired park land along Boulder Creek.

Boulder owns some 8,000 acres of the foothills adjoining the city, including mountains 3,000 feet high, and many jutting rocks known as "Flatirons"; and over this mountain area trails are being improved for hikers and horsemen. For the month or two during which the trails are covered with snow, facilities are being provided for skiing and tobogganing. A number of sliding places have been laid out, and areas have been located in which beginners in the difficult art of balancing on skis can practice with safety. One ski-run has been completed through the pine trees and down the side of the mesa with a take-off for jumping, in plain view of the city, and in a spot which gives the skiers and the spectators a glorious view of the plains and of the city below.

RUDOLPH JOHNSON,
Director of Public Welfare, Boulder, Colo.

Have We Your "Idea"?

Here is the first instalment of contest letters from playground officials reporting the activity or achievement of their 1930 program which they believe the greatest contribution to the advancement of playground practice everywhere. Subsequent issues of the magazine will contain more letters. The contest will close February 1. A prize will be awarded the winning letter from a city over 50,000 in population, and one to the winning letter from a city under 50,000; the letters to be judged by L. H. Weir, of the National Recreation Association.

The prize in each case will be a $20 two-volume set of "Parks: A Manual of Municipal and County Parks," of which Mr. Weir is the author, or in case the winning official already owns this important work, other books of his choice to the value of $20. If we have not your letter already, won't you write it today?

Playing the Safety Game

IN Niagara Falls our most successful playground project has consisted in approximating the great variety of human situations that can be found at the intersection of any two principal highways.

The surface of the playground was laid out to represent this intersection, with sidewalks indicated, and the space in the four adjacent "blocks" divided and designated as hospital, cemetery, fire house, police station, court house, ice-cream parlor, playground, etc. A signal stand was set up in the heart of the intersection and children were allowed to take turns in its operation.

Not only was traffic of the greatest variety encouraged to flow across the intersection under the signal's control, but emergency situations, such as the approach of the fire apparatus, police patrol and ambulance were introduced at intervals to produce changes of pace and alertness. Change of pace was also produced by speeding up the traffic at intervals. Impersonations of characters which the players like to mimic adds zest, and costumes and kiddies' vehicles increase the reality in the activity.

Certain infractions of the traffic laws were handled by an umpire, who applied the usual procedures followed in these cases in civil life, but the greatest incentive was placed upon securing correct traffic procedure by dividing the group into the "East-West" teams and the "North-South" teams, and then awarding to the proper team a point for each time they were able to "carry on" between situation-changes without incurring a penalty. It was found better not to take "time out" for "holding court," "sending to hospital," etc.

Penalties for the most part included elimination from the game by incarceration in the police station, summons to court, temporary residence in the hospital, and in cases of severe "accidents," burial in the cemetery. The umpire specified the length of the interval for which the violator is "ruled out"; a penalty timekeeper kept a record of the transaction and notified offending players when they might return to the game.

A team reduced to 75 per cent of its original personnel was declared defeated, or the team scoring the largest number of points after twenty changes of signals was declared the victor.

EARLE A. PRITCHARD,
Director of Recreation, Niagara Falls, N. Y.

And in Corpus Christi, Too—

This modern "Pittsburgh-Des Moines" destructor plant just completed for the City of Corpus Christi, Texas, contains two 60-ton furnace units with a total daily capacity of 120 tons of garbage.

PROGRESSIVE cities in all sections of the United States today build up the public health by scientific incineration of garbage and refuse. The health of millions is safeguarded from the dangers of unsightly, germ-breeding dumps and foul-smelling, unsanitary garbage piles.

The "Pittsburgh-Des Moines" incinerator has won its outstanding position among municipal officials by—

1—A reliable economic performance at 1400° Fahrenheit or above

2—No objectionable odors, fumes or smoke

3—Utilization of *all* the garbage as fuel—resulting in big fuel savings and low operating costs

4—Selective charging of fresh garbage to any cell of the furnace

5—Simplicity of operation and foolproof construction

Write today for your copy of the new DPM Incinerator Catalog. It contains 24 pages of valuable data—and also shows how other municipalities have solved their disposal problem scientifically and permanently.

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When you write for that catalog, kindly mention THE AMERICAN CITY

METHODS and COSTS of REFUSE COLLECTION and DISPOSAL

Charleston Is Looking Forward

GARBAGE collection in Charleston, S. C., is a "combined system" and is accomplished by carts, wagons and one motor truck. In recent years motorization of the garbage collection equipment has been considered with special reference to the use of tractors and trailers. So radical a change, however, is not easily accomplished, and a report on the subject, now about two years old, is still "in suspense."

Closely related to the change in method of collection is the question of disposal, which at this time is having the attention of the Board of Public Service. No disposal is attempted at present, simply transportation from individual premises to a "dump" on the salt marshes adjoining our tidal rivers, incidentally reclaiming marsh land and mud flats by means of garbage and refuse. That such a system is undesirable is admitted, but at present there are local obstacles to be overcome before a change can be effected. This, it is hoped, will be soon.

The relation between methods of collection and of disposal is evident when we consider the difficulties of maneuvering vehicles over a dump to reach the dumping points and there place them in proper dumping position, and compare these difficulties with the ease with which delivery over a paved road to a garbage destructor can be accomplished.

To handle horse-drawn vehicles over a dump in dry weather is possible, although hard on the draft animal, not only in the matter of exertion, but also in the hazard of injury from refuse, wire, broken bottles, etc. For motor vehicles, passage over even a dry dump is difficult. In wet weather the soaked spongy refuse offers serious difficulty to horse-drawn passage and impassability to motor vehicles. Therefore, where dumping is practiced, as here, disadvantages attend the use of motor vehicles.

A garbage disposal plant, to handle a combined collection of refuse, with paved roadway leading to the incinerator, is not only in the interest of sanitation and esthetics, but simplifies the transportation problem and enables serious consideration of motorization. To this we are trending.

Municipally, there is no salvage from the dump. Some unfortunates, however, realize a scant income from picking at the dump, recovering bottles, metal, bones, rags, etc., which are sold to junk dealers, without disinfection, however.

The cost of collection is approximately $2 per ton, the average haul being about two miles.

The collection consists of:

1. Contents of cans (kitchen refuse, house sweepings, broken glass and china, rags and trash generally)
2. Bulky material such as tree trimmings, lawn cuttings and as much of the ashes as cannot be accommodated in the garbage can.

The working hours are 8 A. M. to 12 M., and 1 P. M. to 5 P. M. Some difficulty is experienced by the failure of householders to place the garbage cans on the sidewalk in time for the first trip of the garbage collectors.

J. H. DINGLE,
City Engineer.

San Francisco's Study of the Garbage Problem

IN June, 1929, the City Supervisors of San Francisco, Calif., passed an ordinance declaring that incineration be adopted as the method of garbage and refuse disposal and that the City Engineer be requested to tour eastern cities to determine the best type of incinerator. From June 28 to July 15, 1929, the City Engineer and W. H. Ohmen, Assistant Engineer in charge of design, visited Chicago, New York, Toronto, St. Paul, Minneapolis, Seattle and Portland, Ore., to investigate refuse disposal. The findings, incorporated in a 72-page report dated August 5, 1929, favored the construction of an incinerator of a type similar to the Seventy-third Street plant in New York or the plants in Toronto, but, rather than specify any particular type of furnace, the City Engineer recommended obtaining the benefits of competitive open bidding, with guarantees covering man-hours per ton of refuse, power consumption, temperature limits, amounts of additional fuel, necessary rate of burning in pounds of refuse per square foot of grate area per hour, freedom from nuisance, smoke, odors, etc.

After numerous meetings of the Health Committee of the Supervisors, it was decided to submit to the electorate at the election of November 5, 1929, four questions for declaration of policy. Proposition 1, endorsing incineration, carried, while all others regarding municipal collection and disposal, private construction or the use of the fill and cover method, lost. Finally, on March 24, 1930, a resolution was passed, appropriating $10,000 for investigation of foundation conditions and preparation of plans by the City Engineer for an incinerator. On April 14, 1930, an ordinance was passed, declaring that an incinerator be constructed without delay; that the City Engineer prepare plans and specifications for an incinerator sufficient to dispose of all the city's garbage and refuse at a cost not to exceed $1 per ton; that the City Engineer make foundation investigations at the present site at Fifteenth and DeHaro Streets; that the cost be defrayed from the funds above provided; and that it was the intention of the Supervisors to receive bids for the construction and operation of an incinerator as specified above, with an exclusive privilege of incinerating the city's garbage and refuse for a 25-year period, with the right of the city to purchase it at an agreed price.

The City Engineer immediately began work under the provisions of the ordinance. Surveys have been made for grading work, studies made of garbage deliveries and of the delivery trucks and wagons, the proposed 10-ton, 6-wheel trucks, forced-draft fans, gondola cars, concrete chimneys, spur track construction and other details. Fifteen preliminary studies were made of the incinerator layout to be used by the architect in final design of buildings, ramps, and storage and charging floors. These plans, consisting of 40 drawings, are now 95 per cent complete. Specifications for the building, with all appurtenances, including furnaces, combustion chambers, flues, preheaters, chimneys and necessary equipment, are almost completed, and estimates of cost are in preparation.

Foundation investigations, by means of nine test holes and by test piles, show about 11 feet of fill over the original ground surface. Considerable beach sand, some of it very wet, was encountered. A good supporting stratum can be obtained within a reasonable depth so that piling will probably be unnecessary. It is expected that the complete report will be issued at an early date.

—From the Annual Report of the Bureau of Engineering, M. M. O'Shaughnessy, City Engineer.

Trucks, Trailers and Wagons Used in Windsor

ALL garbage and other burnable refuse for the city of Windsor, Ont., is incinerated. Ashes and rubbish that will not burn are hauled to the city dump on the shore of the Detroit River, where swamp land is being reclaimed. A considerable quantity of ashes goes into unpaved alleys in the suburban area.

The collection equipment of the city consists of dump-trucks, trailers and wagons. The capacity of the garbage trucks and wagons varies from ½ to 1½ tons, and the capacity of the rubbish vehicles from 3 to 6 yards.

For the year 1929 the garbage tonnage was 12,059, with a cost of $32,559.15 for the labor, collection and burning. For the same year the collection of rubbish and ashes amounted to 16,985 loads, with a labor collection cost of $39,179.15.

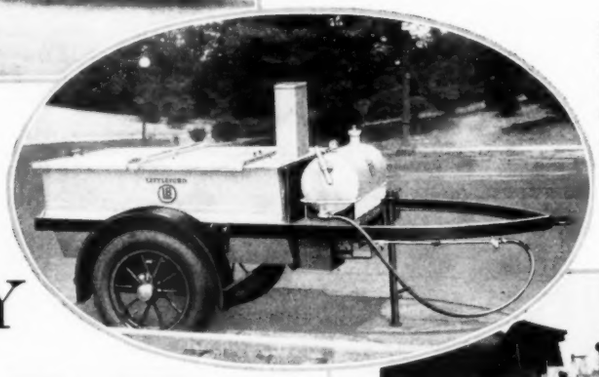
The streets are kept clean by auto flushers and sweepers, in addition to a few hand sweepers in the downtown section.

There has been very little variation for many years in the garbage collection and disposal system.

E. P. HOLDEN,
Chief Sanitary Inspector.

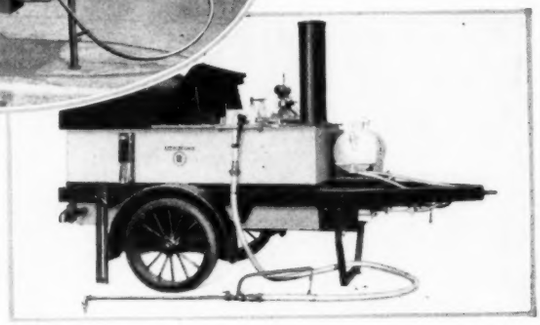
The Littleford Motor-Driven Emulsion Sprayer. Time required to apply emulsions with pouring pots is cut in half by this machine.

No. 84-HD Asphalt Kettle equipped with pneumatic tires. Trail it 30 or 35 miles an hour. When you're in a hurry—hurry!



The Trail-O-Heater, a 300-gallon kettle, equipped with the Littleford Motor-Driven Spray. Such an outfit is ideal for large patch jobs and small resurfacing work.

They're on DISPLAY at the A·R·B·A ROAD SHOW



Asphalt Kettles (Oil and Wood Burning)
Asphalt & Emulsion Sprayers
Tool Boxes
Tool Heaters and Surface Heaters
Water Heaters and Concrete Heaters
Steel Mortar Boxes
Salamanders
Joint Fillers
Squeegee Machines
Tools and Pots
Traffic Line Markers
Grout and Mastic Mixers

Have you ever wanted or hoped for an emergency road repair outfit that could be trailed 30 or 35 miles an hour? You'll see one at the Littleford booth.

Do you use emulsions for surface treatment? If you do, you will be interested in the new Littleford Emulsion Sprayer—hand and motor driven.

Have you seen the Littleford All-Steel Tool Box for highway work? You won't want any more makeshift boxes after you see it.

That Littleford Joint Filler will fill joints and mark an asphaltic line at the same time, if you want it to.

All of the latest Littleford maintenance outfits, new and improved, are on display at Booth B-43. If you can't see them at the St. Louis Road Show, write for our complete catalog.

Littleford Bros.
500 E. Pearl St.
Cincinnati, Ohio

Gentlemen:
Without obligation to me, send your complete catalog showing Littleford Road Maintenance Equipment.

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LITTLEFORD

Road Maintenance Equipment

SINCE 1900

LITTLEFORD BROS. 500 E. PEARL ST. CINCINNATI, O.

REG. U. S. PAT. OFF.

"Keep Your Streets Clean"

Items on Street Cleaning and Snow Removal

New York's Unemployed Clean Up Its Vacant Lots

THE vacant lots of the Bronx, New York City, all of them privately owned, have been the dumping-ground of the borough for more than fifteen years. The menace to the health and comfort of the community has long been evident, and the unsightly appearance which the dumping-grounds have given to the borough has been the frequent subject of civic conferences. Nothing was done until recently, with the establishment of the Department of Sanitation and the extension of the facilities and funds of the Health Department.

The initial spark was furnished by the Outdoor Cleanliness Association, it being the Association's idea to approach both the Emergency Relief Committee and the Department of Sanitation for cooperation in the project of cleaning up the Bronx lots.

The lots had been filled with mattresses, bedsprings, the rusty chassis of broken-down automobiles, broken boxes and, in the wine-making districts of the borough, heaps of grape skins. From many of the lots, fifteen to eighteen truckloads were removed in a day, and hundreds of small piles of rubbish have been taken away. A wrecking-car to pick up the junked automobiles or any pieces too heavy for the workmen to handle has been put into service, and a spot of swampland far removed from places of public assembly has been designated as the resting-place for the old automobiles.

From fifteen to twenty men are put to work on a lot, and 230 lots have been cleaned. Those adjacent to the Yankee Stadium were cleaned so that cars could be parked for football games. Not all of the men sent to the Bronx by the Emergency Employment Committee are allocated to the lots. Many of them work in the city parks. Fully half of them are put to work directly under the Sanitation Commission to clean streets. Many who work for three days during the week fail to show up when their turn comes round again, but there is no dearth of men to do the work, and nearly a thousand a day are working in various parts of the borough.

In the beginning the men were scheduled to work six days a week at the rate of $3 a day, but with the number of idle and out of work increasing daily, it was decided to work the men on three-day shifts at the rate of $5 a day. The men went about their work supervised by William Montgomery, Borough Superintendent of Sanitation in the Bronx, and in two weeks restored order out of chaos in 150 disreputable lots.

As far as employment is concerned, the project offers endless opportunities. Throughout the five boroughs of New York City there exist huge areas of conspicuous uncleanliness. Along the waterfront on both the East and West Sides, men are now working to clear away the broken rotting timber and the rubbish that collects at the dead ends of streets.

New Equipment to Clear Calhoun County's Roads

THE roads of Calhoun County, Mich., will be kept free from snow this winter through the use of new equipment. Six new plows and 2½ miles of snow-fence have been added to the county road equipment during the last few months. Five miles of snow-fence is now being placed on the north-and-south roads of the county by road men, although few fences will be placed on the east-and-west roads, as the prevailing wind in that section is in the west, causing most of the snowdrifts on the roads running north and south.

Fifteen snow-plows, including one tractor-plow, will be used to keep the roads free from drifts. Included in this number are one new V-type plow, five V-type plows purchased at the end of the 1929 season, one tractor plow, and eight old-type scraper plows to be attached to trucks. This equipment is equally distributed throughout the county and is stored in county garages. Several road men may be employed later as drivers or driver-assistants when all the plows are in operation. No more than two men are ever placed on one clearing job, and often only one man is sent to manipulate the truck and plow.

The city of Marshall, county-seat of Calhoun County, has purchased but one new truck for use during the winter. The city now has two trucks with plows, as well as a number of workmen with horse-drawn snow-plows for cleaning the sidewalks.

—*Battle Creek Evening News.*

199,348 Miles of Highways Cleared of Snow and Ice

STATE and local agencies in the 36 states which lie in the snow belt cleared snow and ice from 199,348 miles of state and local highways in the winter of 1929-30. The cost of clearing 184,748 miles amounted to $8,224,368.

The patrol system is considered the best method for keeping the roads open. A definite section of highway is assigned to a patrol officer and crew with the necessary equipment of trucks, tractors, or graders. The crews go to work at the start of snowfall and work on the given route until the road is clear.

Drift prevention continues to be of considerable importance, and the mileage of snow-fence is increasing yearly. About 8,200 miles of fence were used last season, an increase of about 40 per cent over the preceding winter.

To prevent skidding, especially on curves and steep grades and at railroad crossings, several highway departments spread cinders or sand over slippery areas. Others mixed or spread calcium chloride with this material.

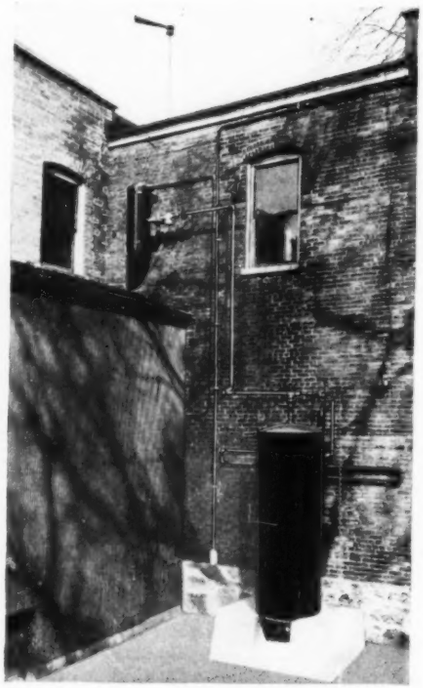
There were no important changes in the type of equipment used for snow removal. State and local agencies report a total of 7,372 trucks, 2,788 tractors and 2,587 graders used in the clearing of 184,748 miles of highways.

U. S. BUREAU OF PUBLIC ROADS.
Washington, D. C.

SMALL ELECTRIC TRUCK TRACTORS ARE NOW BEING USED IN PARIS TO HELP IN DISPOSING OF STREET SWEEPINGS AND OTHER REFUSE

Dozens of these miniature electric locomotives are seen on the street hauling two or more small trucks loaded with refuse

A PUBLIC ALARM *with a* FINE SERVICE RECORD



Outdoor Diaphone installations provide the most satisfactory service. Compressor is located inside building. Note location of Diaphone horn above the roof.

Fires demand emergency action, particularly in those cities and towns depending upon a volunteer fire department for protection. The quickest and most accurate method of summoning the volunteer firemen is by means of a public alarm. Such an alarm should have:

(1) Extensive carrying power
(2) A distinctive and alarming tone
(3) Good coding qualities
(4) Reserve capacity

For years the steam whistle has made a dependable public alarm for cities and towns; but during the past several years the electrification of factories and water works, which formerly supplied 24-hour-a-day, all-year-round steam for this purpose, has made it necessary for fire chiefs and other city officials to look elsewhere for a satisfactory public alarm.

The most satisfactory modern public alarm available to take the place of the steam whistle is the Gamewell *Diaphone*. Its carrying power is tremendous; its tone is distinctive and alarming; it will code rapidly; and it has a reserve capacity that acts as a safeguard against shut-downs in the electric power supply.

Furthermore, the *Diaphone* is the basis of a modern street fire alarm box system. Once it is installed, street fire alarm boxes of the latest type can be added later as the city grows, without discarding any of the original equipment.

Write for a copy of leaflet No. 2022

THE GAMEWELL COMPANY

NEWTON, MASSACHUSETTS

"A Box and Block"

TRAFFIC—FIRE—SAFETY

Items for Departments of Public Safety

For More Adequate Protection of Railway Grade Crossings

THE fact that the number of deaths at grade crossings of highways with railroads has remained relatively stationary for the last seven years (2,485 in 1928), while there has been an increase during the same period of more than 76 per cent in the motor-vehicle registration of the country, is cited by W. R. Cole, President of the Louisville and Nashville Railway, as indicating progress by the railroads in dealing with the grade-crossing problem. In a statement recently issued by the National Conference on Street and Highway Safety, Mr. Cole calls attention to the fact that notwithstanding the annual expenditure of $60,000,000 or more in recent years by the railroads for the elimination of grade crossings, there has been a continued increase in the number of grade crossings in the United States, owing to railroad extensions and the building of new highways.

Mr. Cole points out the fact that on his own railroad 40 per cent of the total grade-crossing accidents are at crossings that are protected by watchmen, visible and audible signals, or by gates. He also shows that 54 per cent of the accidents at crossings on the Louisville and Nashville Railway are in broad daylight, and most of them involve persons who live in the community where the accident takes place—persons who are thoroughly familiar with physical details of the crossings, and often familiar with the schedules of the trains involved.

From statistics such as these THE AMERICAN CITY suggests that three major conclusions may well be drawn:

1. That the actual separation of grades ought to be carried on to an increasing extent.

2. That the education of motorists in public safety ought to be made more widespread and efficient.

3. That where the expense of eliminating grade crossings is prohibitive, there ought in very many cases to be more liberal appropriations than the railroads have generally made for the installation of protective devices of maximum efficiency. Shortsighted economy in the protection of railroad grade crossings may mean large expenditures for the railroads in damage claims, in addition to the loss of life and personal injury to which railroad officials as public-spirited citizens of their respective communities are giving increasing consideration.

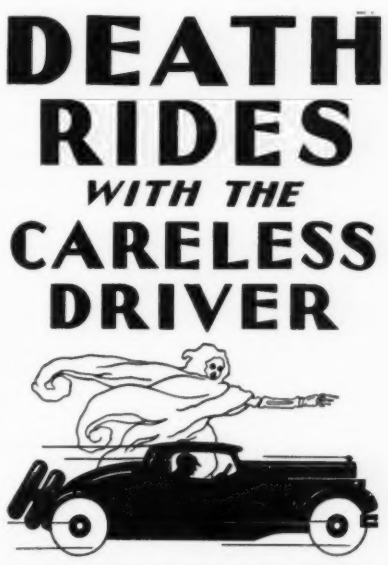
In the financing of grade-crossing separations, a division of expense between the public and the railroads is the accepted policy. It is justified because the expenditures involved bring greater safety and facilitation of traffic to the users of both the highway and the railroad. Why should not a similar division of costs be considered good policy in the installation of the efficient and somewhat expensive types of protection needed at grade crossings where accidents now occur?

Traffic Deaths Are Murders!

"MURDER usually is designated as the result of malice aforethought, but the law imputes such malice to the driver when the killing is done in a deliberately reckless or careless manner," declares George E. Clarkson, of the Pittsburgh Better Traffic Committee.

To bear out the rather blunt accusations that often the driver *can* help it and that most accidents do not *just happen,* Mr. Clarkson presents official statistics to show that of all the 1,152 street traffic fatalities occurring in Pittsburgh over a period of seven years and five months, 57.1 per cent involved direct motorist responsibilities.

In the light of such statistics, he adds, the motorist has (according to the opinions of such bodies as the Accident Prevention Sub-Committee of the Better Traffic Committee and the Western Pennsylvania Safety Council) a definite responsibility in several different directions: He must determine whether he is mentally and physically fit to drive; he must make sure that his car is in proper mechanical condition to be driven; and he must understand the rules and customs of the road. The man or woman who disregards this responsibility may not be a criminal, but may merely be "accident-prone." He is, however, as great a hazard to the public at large as a criminal.



A RECENT POSTER IN THE PUBLIC SAFETY SERIES OF THE NATIONAL SAFETY COUNCIL

New York State Firemen and Policemen to Seek Minimum Salary of $3,000 a Year

THREE cities in New York State, Mount Vernon, New York and Yonkers, pay firemen and policemen a maximum salary of $3,000 a year. The average maximum paid to patrolmen in 1930 in 54 cities in the state was $1,942, an increase of 52 per cent over the 1919 average maximum. The 1930 average minimum salary for patrolmen was $1,761, an increase of 48 per cent over the 1919 average minimum. The average maximum for firemen in 50 cities in 1930 was $1,879, which represents 60 per cent more than they received in 1919, and their 1930 average minimum was $1,671, an increase of 58 per cent over the 1919 average minimum.

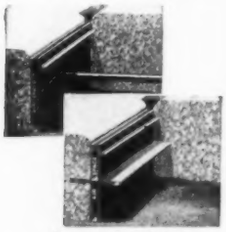
This information has been compiled by the New York State Bureau of Municipal Information, which also reports that at a recent joint meeting of committees representing the police and paid firemen of the cities, it was decided to seek legislation this winter requiring all cities to pay their firemen and policemen a minimum salary of $3,000 a year. A bill introduced at the last session of the Legislature setting $2,500 a year as the minimum wage for city policemen and firemen who have served regularly for four consecutive years failed to pass.

Policewomen in the United States

A RECENT census of policewomen in the United States discloses the fact that there are 593 women performing police duties in all but six* of the forty-eight states and in the District of Columbia, according to an announcement by the International Association of Policewomen. Some hold full-time positions as policewomen, others are sheriffs, deputy sheriffs, under-sheriffs, deputy constables, deputy police commissioners, "county detectives," dance hall inspectors, matrons, peace officers, and social workers with police power. Massachusetts has the first three state policewomen to be appointed in the United States. Seven states have county policewomen, and 24 cities have bureaus. New York City has the largest force of policewomen, with 115. Detroit has 45, Chicago 30, Washington 23, Los Angeles 22, St. Louis 18, Cleveland 15, and Portland, Ore., and Sonoma County, Calif., 11 each.

*No figures are reported for Arizona, Delaware, Montana, Nevada, West Virginia or Wyoming.

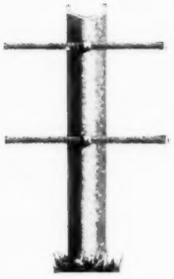
Welded Steel Fabric



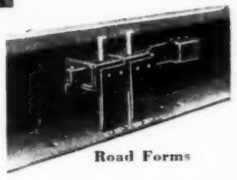
Expansion Joints

Contraction Joints

Curb Bars



Highway Guards



Road Forms

Economy in First Cost and Maintenance

TRUSCON REINFORCING PRODUCTS increase the life and reduce the upkeep expense of concrete roads and pavements. Quality, speed and economy of construction are insured with Truscon Products.

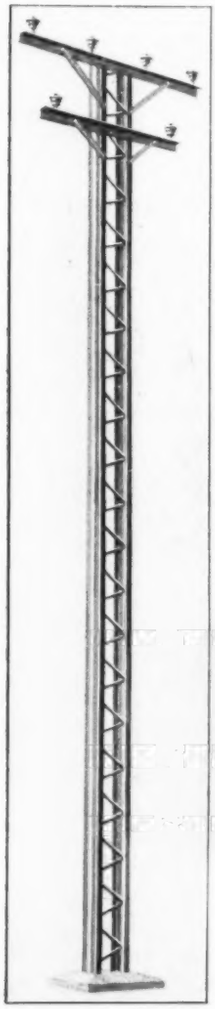
TRUSCON STANDARD BUILDINGS for tool houses, garages, storage, etc., provide fireproof housing which is quickly erected at economical cost. Available in all types and sizes, with flat or pitched roofs.

TRUSCON WELTRUS STEEL POLES for transmission lines, lighting and trolleys, and Floodlight Towers for athletic fields, airports and parks, provide safety, neat appearance and efficiency at low cost.

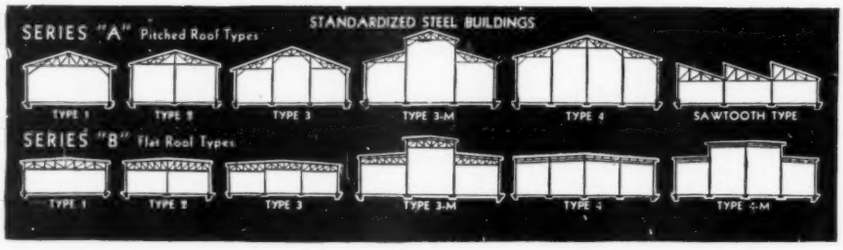
Truscon furnishes a complete line of quality steel products for every requirement of permanent construction. Write for catalogs and prices.

TRUSCON STEEL COMPANY, YOUNGSTOWN, OHIO

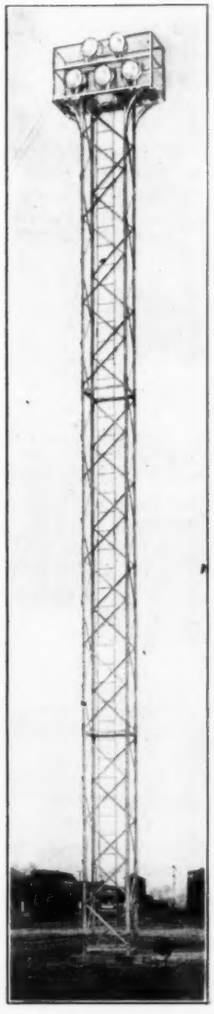
Warehouses and Offices in all Principal Cities



Transmission Structure



Standardized Steel Buildings



Floodlight Tower

TRUSCON

Steel Windows—Steel Doors—Steel Joists—Metal Lath s—Steeldeck Roofs—Reinforcing Steel

DAN E. LEVIN
Police Chief
Cadillac, Mich.
(Appointed 1924)

ROY PITTS
Fire Chief
Independence, Kans.
(Appointed 1919)

HERBERT L. WHITE
Police Chief
Sault Ste. Marie, Mich.
(Appointed 1927)

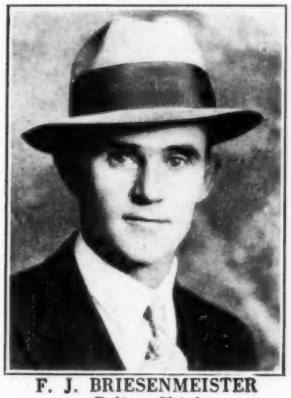
JAMES FIFAREK
Fire Chief
Traverse City, Mich.
(Appointed 1927)

J. W. THOMPSON
Police Chief
Alhambra, Calif.
(Appointed 1929)

Who's Who in Public Safety

The 37th of a Series of Portraits of Fire and Police Chiefs Which Has Appeared Monthly Since January, 1928

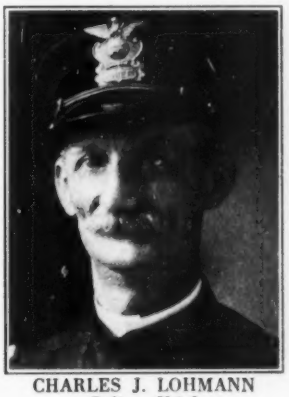
B. F. LANPHEAR
Police Chief
Beloit, Wis.
(Appointed 1925)



F. J. BRIESENMEISTER
Police Chief
South Milwaukee, Wis.
(Appointed 1917)

L. J. BRAUN
Fire Chief
South Range, Mich.
(Appointed 1915)

H. H. McCALL
Fire Chief
Wichita, Kans.
(Appointed 1927)



CHARLES J. LOHMANN
Police Chief
St. Bernard, Ohio
(Appointed 1922)

WILLIAM T. LORIMER
Police Chief
Royal Oak, Mich.
(Appointed 1928)

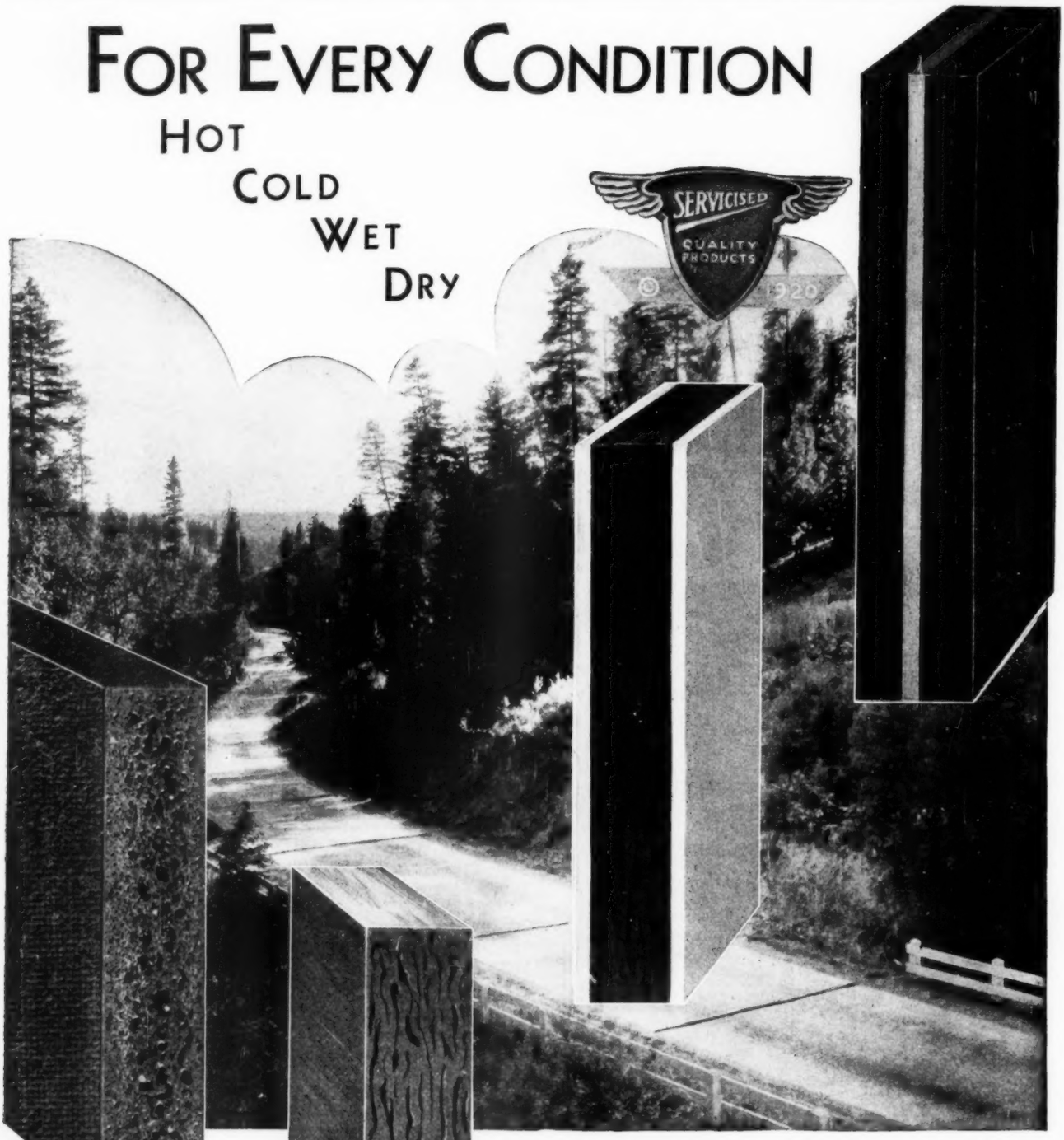
CHARLES L. PEAPPLES
Police Chief
Benton Harbor, Mich.
(Appointed 1930)

N. P. FOURNIER
Police Chief
Hancock, Mich.
(Appointed 1929)

HUGH GORDON
Police Chief
Battle Creek, Mich.
(Appointed 1927)

FOR EVERY CONDITION

HOT
COLD
WET
DRY



The Servicised Sponge Rubber Expansion Joint is the most perfect protection from severe water conditions and extreme heat. A non-oozing super-elastic joint material—impervious to water.

Type "B" Servicised Expansion Joints are of special quality asphalt and selected fibres—very low in moisture absorption—maximum elasticity and plasticity—minimum of oozing—long life and resistant to traffic wear.

Reinforced Servicised Expansion Joints were developed for requirements demanding rigidity and strength in fillers. The core of fiber is heavily saturated with high quality asphalt and reinforced on the sides by sheets of saturated felt—a quality joint for certain conditions.

Servicised Center-Core Expansion Joints of fibrated asphalt take up expansion and contraction and assure waterproofing by close adhesion to the pavement proper. The fiber center core reinforces and furnishes elasticity while the fibrated asphalt sides guarantee adhesion to the pavement slab.

Write us of your conditions and get our recommendations.

SERVICISED PREMOULDED PRODUCTS, INC.

GENERAL DISTRIBUTORS For Products Manufactured by

SERVICISED PRODUCTS CORPORATION

FACTORIES AND SALES OFFICES

Chicago, 53 W. Jackson Blvd. — Sandusky, Ohio, 1st and Sandusky Sts. — Wilmington, Del., Church and F. Sts.

USE THIS FREE SERVICE

THE AMERICAN CITY should always be mentioned when writing for this material which is furnished free. Keep your files up to date by checking over these items each month and writing for those you need.

ROAD CONSTRUCTION AT LOW COST

Complete data regarding Bitumuls, which may be applied at any atmospheric temperature except freezing, and in damp or even mildly rainy weather, producing a durable, non-skid paving for low-cost secondary road construction, for primary roads, city streets, subdivisions, widening, resurfacing, maintenance and airports, will be sent on request by the American Bitumuls Co., 200 Bush St., San Francisco, Calif.

CROSSING PROTECTION

A grade-crossing gate which fits in with existing conditions and forcibly stops cars, trucks or busses whose drivers attempt to cross railroad tracks at times of danger, and which is simple, quick and easy to install at low cost, is described in literature which is available from the Franklin Railway Supply Co., Inc., 60 E. 42nd St., New York.

GRANITE CONCRETE STANDARDS

The American Concrete Marbelite Co., 4727 N. Lamon Ave., Chicago, Ill., will gladly send literature describing Marbelite centrifugally cast granite street-lighting standards, which have been selected by many cities for their beauty in sculptured design and natural color, as well as for strength.

DIESELS FOR ANY SERVICE

The Fulton Iron Works Co., St. Louis, Mo., will be glad to analyse your city's power requirements and make recommendations without obligation for doing the job economically with Fulton diesel engines. Literature is available on request.

AN UNFAILING FIRE-ALARM

Complete descriptions and prices of the Diaphone, which provides a safeguard against failure in the electric current supply and which can sound a fire-alarm even though the electric current has been shut off for 24 hours, may be secured on request from the Gamewell Co., Newton, Mass.

MOTOR ROAD ROLLERS

An illustrated booklet describing Buffalo-Springfield rollers, which are built in every practical weight and size, steam- and motor-driven, three-wheel and tandem, with scarifier and other attachments optional, will be sent on request by the Buffalo-Springfield Roller Co., Springfield, Ohio.

VALVES AND HYDRANTS

The new Rensselaer Catalog "G" is now ready for distribution to municipal officials desiring the latest information on Rensselaer valves and Corey hydrants. Copies may be secured from the Rensselaer Valve Co., Troy, N. Y.

ASYMMETRIC LIGHTING REFRACTORS

Complete information on which to base your choice of the proper refractors for street lighting, as well as copies of Data Sheets Nos. 8150 and 8154 and other engineering data, is available on request from the Holophane Co., Inc., 342 Madison Ave., New York.

WATER-SUPPLY FILTERS

Roberts Filter Mfg. Co., 602 Columbia Ave., Darby, Pa., will gladly send complete information regarding Roberts filters and their use in municipal water-supply systems and recirculation installations for outdoor and indoor swimming pools.

POLICE RADIO SYSTEMS

The DeForest Radio Co., Passaic, N. J., will gladly send to municipal police officials complete data on the DeForest police radio systems, which are built for cities of 5,000 population or state-wide coverage.

TRACTORS FOR EVERY SERVICE

Caterpillar Ten, Fifteen, Twenty, Thirty and Sixty tractors, which provide tractor power for all kinds of work, are described in literature which may be secured without obligation from the Caterpillar Tractor Co., Peoria, Ill.

POWER LAWN-MOWERS

Bulldog gang mowers in 5- and 3-unit types, Ideal power mowers with 22- and 30-inch rollers and 20- and 25-inch wheels, and the Ideal triplex mower, are described in the catalog of the Ideal Power Lawn Mower Co., 400 Kalamazoo St., Lansing, Mich.

CHLORINATING EQUIPMENT

An interesting folder, "Texas Believes in Chlorination," describing several of the W & T chlorinator installations in that state, has been issued by Wallace & Tiernan Co., Inc., Newark, N. J., and will be sent to municipal officials on request.

ASPHALT PLANKING FOR BRIDGES

Complete data regarding Servicised fibrated asphalt planking for bridge floors, which is not slippery, is waterproof, deadens noise and vibrations, is economical, wears a long time and smooths out and heals itself under traffic, is available on request from Servicised Premoulded Products, Inc., 53 W. Jackson Blvd., Chicago, Ill.

CAST IRON WATER PIPE

City officials interested in bell-and-spigot gas and water pipe and fittings, cement-lined pipe and fittings, flexible pipe joints, standard and extra-heavy companion, blind and reducing flanges and miscellaneous castings, should write to the Lynchburg Foundry Co., Lynchburg, Va.

A SELF-PRIMING NON-CLOGGING SEWAGE PUMP

The Jennings suction sewage pump, of the non-clogging type designed to economically pump waste, sewage, trash or any fluid containing large percentages of solids, is completely described in Bulletin No. 113 issued by the Nash Engineering Co., South Norwalk, Conn.

METER BOXES AND MUNICIPAL CASTINGS

The Griffin Foundry & Mfg. Co., Rome, Ga., has issued a well-illustrated 33-page booklet covering its complete line of service boxes, meter boxes, manhole castings and covers and catch-basin castings. A copy of this booklet may be secured from the above company.

RECLAIMING CORRODED STEEL POLES

Tubular steel poles that have become corroded or pitted at the grade line may be reclaimed through the use of the Elreco protection and reclamation shield, manufactured by and described in the literature of The Electric Railway Equipment Co., 2901 Cormany Ave., Cincinnati, Ohio.

MUNICIPAL GARBAGE INCINERATION

A new 24-page booklet containing data and information on municipal garbage disposal by incineration will be mailed by the Pittsburgh-Des Moines Steel Co., 3481 Neville Island, Pittsburgh, Pa., to city officials writing for a copy of booklet No. 79.

AUTOMATIC REELS FOR ELECTRIC CORD

The many uses of Reelite automatic reels for holding various lengths of electric cord, keeping it from kinking, and protecting it from wear, and maintaining a uniform tension on the cord—these reels being particularly adaptable for equipping portable floodlights on fire apparatus—are completely described in the literature of the Appleton Electric Co., 1701-29 Wellington Ave., Chicago, Ill.

A NEW MODEL INDUSTRIAL TRACTOR

The new Model-30 McCormick-Deering industrial tractor, which retains all the features of the Model-20, but which in addition has greater power, is completely described in literature which may be secured from the International Harvester Co. of America, 606 S. Michigan Ave., Chicago, Ill.

ALL-STEEL PIPE COUPLINGS

Dayton steel and malleable iron pipe couplings for gas and water mains are completely described in an illustrated 63-page catalog issued by the Dayton Pipe Coupling Co., Dayton, Ohio.

STORM SEWERS

City officials interested in securing literature on drainage, with suggestions for the solution of specific storm-sewer problems, should write to the Armco Culvert Mfrs. Assn., Middletown, Ohio.

PUMPS FOR WATER-WORKS

Complete data regarding DeLaval high-lift pumps and their application in municipal water treatment and pumping plants, may be secured without obligation from the De-Laval Steam Turbine Co., Trenton, N. J.

TREES—SHRUBS—EVERGREENS

Pontiac Nurseries, Romeo, Mich., will be pleased to mail to park and cemetery superintendents and other buyers for civic plantings a copy of its new Planting Guide and special price list.

ASPHALT PLANTS

Combination hot and cold mix asphalt plants in which materials are dried and cooled to proper temperature for all types of cold mixed tar and asphalt materials, are manufactured by the Asphalt Equipment Co., Scottdale, Pa., which will send complete descriptions on request.

STEEL POLES FOR STREETS

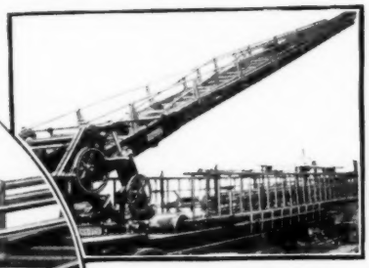
Complete information and catalogs, describing Union Metal heavy-duty poles, which may be equipped to carry street-lighting units, cross-arms, trolley span wires and other street wires, are available from the Union Metal Mfg. Co., Canton, Ohio.

WARNING LANTERNS

R. E. Dietz Co., New York, will gladly send to interested municipal officials, complete information regarding Dietz red lanterns for marking construction and road work.

AS USUAL, AHRENS-FOX presents the NEW in Aerial Ladders

Firemen run up the Ahrens-Fox aerial ladder with a sureness they never knew before. They can always depend on this new method of bracing to keep the ladder rigid no matter how many firemen are on it.



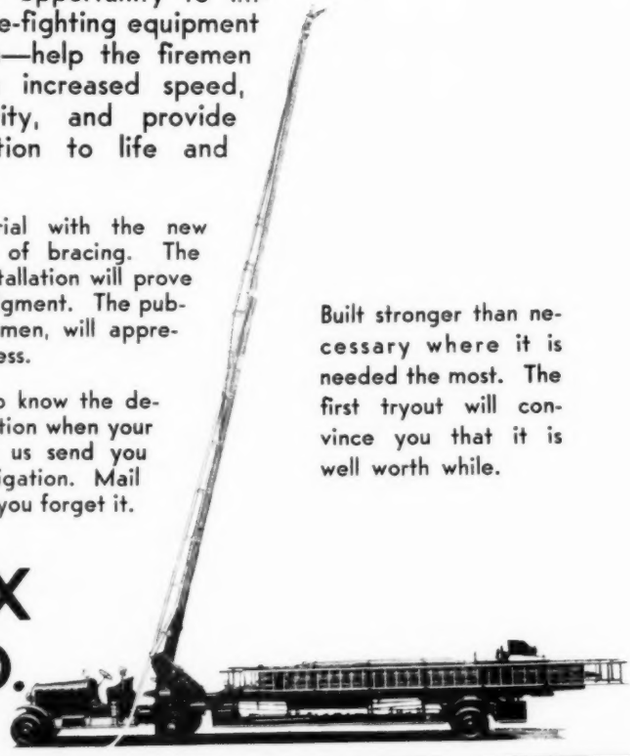
The Ahrens-Fox aerial ladder turns in either direction, at any angle, always under absolute control.

Here's your opportunity to improve the fire-fighting equipment of your town—help the firemen to work with increased speed, greater security, and provide added protection to life and property.

It's the tower aerial with the new Ahrens-Fox method of bracing. The first fire after the installation will prove the wisdom of your judgment. The public, as well as the firemen, will appreciate your progressiveness.

Anyway you will want to know the details for your own satisfaction when your friends discuss it, so let us send you Bulletin No. 157. No obligation. Mail the coupon today—before you forget it.

Built stronger than necessary where it is needed the most. The first tryout will convince you that it is well worth while.



THE AHRENS-FOX FIRE ENGINE CO.
CINCINNATI, OHIO, U.S.A.

Without any obligation whatever on my part, send me Bulletin No. 157.

Name .....

Address .....

City ..... State .....

TIES FOR POLICE AND FIREMEN

The Century bow tie, which is made of leather and is designed to hold its shape indefinitely, will not crush or crack and from which water, grease, dust or dirt can be wiped with a cloth, is described in a folder which will be sent on request by the Century Tie Co., 9377 Woodside, Detroit, Mich.

DEOXIDIZED COPPER WATER SERVICE PIPE

The American Brass Co., Waterbury, Conn., will gladly send complete information regarding Anaconda deoxidized copper tubes, which are strong and highly resistant to corrosion, eliminating the danger of damaged pipes due to freezing.

FOR CITY PLANTING

A copy of the catalog of the Naperville Nurseries, Box A, State Route 18, Naperville, DuPage County, Ill., describing this company's line of ornamental trees, shrubs, evergreens, vines and perennials for parks, playgrounds, cemeteries, subdivisions, street improvements and forestry projects, will be sent on request to interested municipal officials.

A NEW PIPE MANUAL

A new issue of the American Pipe Manual, containing valuable data for the use of pipe men everywhere, has just been brought out by the American Cast Iron Pipe Co., Birmingham, Ala., and is available to municipal officials on request.

WATER METERS

Complete information regarding Watch Dog water meters, which are dependable for municipal installations, may be secured without obligation from the Gamon Meter Co., Newark, N. J.

PIPE FITTINGS

A copy of the Pipe Economy catalog, listing Clow-National fittings, including cutting-in-tees, split sleeves, half-circle pipe, valves, hydrants, manhole covers, valve boxes and special castings, as well as Clow-National cast iron pipe, may be secured on request from James B. Clow & Sons, Chicago, Ill., or National Cast Iron Pipe Co., Birmingham, Ala.

EFFICIENT FIRE APPARATUS

For complete information on the Master Series fire apparatus, in which the high quality of the materials used makes for lightness of the whole, adding to the ease and speed of handling, city officials should write the American LaFrance and Foamite Corp., Dept. C35, Elmira, N. Y.

ACCURACY IN METERS

The use of renewable, heat-proof, hard-rubber bushings on all spindles of the gear train and register of Trident meters guards against corrosion and insures sensitivity and sustained accuracy. Complete information regarding these meters may be secured from the Neptune Meter Co., 50 E. 42nd St., New York.

FLOODLIGHTS FOR SPORTS

American floodlights, which furnish intense and thorough illumination for football fields, playgrounds, swimming pools, filling stations and wherever a flood of light is needed, are described in literature which may be secured on request from the American Playground Device Co., Anderson, Ind.

WATER-LUBRICATED PUMPS

Bulletins describing Pomona water-lubricated turbine pumps, in which no oil is used below the surface, and friction losses are at a minimum, may be secured without obligation from the Pomona Pump Co., Pomona, Calif.

WIRE REINFORCING FABRIC

The American Steel & Wire Co., 208 S. La Salle St., Chicago, or 30 Church St., New York, will gladly send information regarding American wire fabric in triangle mesh or electric weld and in rolls or sheets, to interested street and road officials.

DEEP-WELL PUMPS

Bulletin 36 of A. D. Cook, Inc., Lawrenceburg, Ind., describes Cook self-oiling, weatherproof, deep-well turbine pumps, which are compact, sturdy, efficient and adaptable as well as fool-and trouble-proof.

INSPECTION OF WELDED STEEL FRAMING IN BUILDINGS

Robert W. Hunt Co., 2200 Insurance Exchange, Chicago, Ill., has reprinted for general distribution this paper by Franz Eder, Mechanical Engineer, of the New York office of the company, which was presented before the annual convention of the International Acetylene Assn. Since the welding of steel structures is now a recognized method of steel construction, and the proper inspection of such welded joints is of considerable importance, this paper will be of particular value to both municipal officials and contractors.

AN INVESTMENT IN SNOW-PLOWS

The latest snow-plow catalog of La Plant-Choate Mfg. Co., Inc., Cedar Rapids, Iowa, describes this company's complete line of truck- and tractor-mounted plows and particularly the new light-duty hand-operated snow-plow for use with or without side wings on Caterpillar Twenty and Thirty tractors.

A SMALL DITCHER FOR NARROW TRENCHES

An 8-page illustrated folder containing details and specifications of the C. H. & E. Goldigger ditcher, which digs trenches up to 6 inches in width and 48 inches in depth, may be secured from the National Equipment Corp., 30th St. & Concordia Ave., Milwaukee, Wis.

TRUCK-TYPE MOLDBOARD SNOW-PLOWS

The Ross moldboard snow-plow, which clears snow from any road and is built to fit any truck, is completely described and illustrated in a new illustrated catalog issued by the Burch Corp., Crestline, Ohio.

SEWER PIPE CLEANING DEVICES

Allan J. Coleman, 208 N. Wabash Ave., Chicago, Ill., will be pleased to send complete information regarding Coleman sewer pipe cleaning devices which have been used in many cities throughout the United States. Also ask for a Coleman blotter.

MUNICIPAL FILTRATION AND SOFTENING PLANTS

A 12-page bulletin illustrating and describing chemical feeding equipment, rate controllers, gages, operating tables, filters, underdrains and auxiliary apparatus necessary for the operation and control of the modern municipal water purification plant, may be secured on application to the International Filter Co., 59 E. Van Buren St., Chicago, Ill.

THE PROTECTIVE VALUE OF INDEPENDENT INSPECTIONS

Pittsburgh Testing Laboratory, Stevenson and Locust Sts., Pittsburgh, Pa., has issued a most instructive booklet of interest to contractors, engineers and municipal officials, discussing the question of responsibility and inspection and also outlining the broad scope of the inspection service of this laboratory, which is available to individuals, corporations and municipalities.

A SAND SPREADER FOR WINTER ROAD MAINTENANCE

Bulletin KSS issued by the Good Roads Machinery Co., Inc., Kennett Square, Pa., describes completely the Good Roads sand spreader, with which varying quantities of sand may be spread in widths of 9 feet over slippery pavements as a maintenance and safety measure.

MANUFACTURING WROUGHT IRON FOR PIPES

A. M. Byers Co., Clark Bldg., Pittsburgh, Pa., has issued an illustrated booklet describing the new method of manufacturing wrought iron for pipes under the Aston patents. Copies may be secured by any interested municipal or civic officials.

BITUMINOUS DISTRIBUTORS

The Kinney Junior heater and distributor, which is especially designed for municipal and general requirements, comprising road and street construction and maintenance calling for the application of bituminous material, and which will heat and apply all varieties of bituminous material, hot or cold at any temperature and volume as desired, is described in a catalog of the Kinney Mfg. Co., Boston, Mass., which is available on request.

WATER-SUPPLY SYSTEMS

Complete information regarding Layne water-supply systems and Layne pumps will be sent to interested municipal officials on request by Layne & Bowler, Inc., Memphis, Tenn.

ORNAMENTAL TREES AND SHRUBS

A complete stock of quality ornamental trees, shrubs and hardy perennials is maintained by Henry Kohankie & Son, Painesville, Ohio, who will be pleased to send their price list on request.

VITRIFIED FILTER BLOCKS

Information and prices on Dee single-unit, glazed, vitrified blocks for the aeration and drainage of trickling filters, are available without obligation from Wm. E. Dee Co., 1233 Wabash Ave., Chicago, Ill.

REINFORCED CONCRETE PIPE

The Lock Joint Pipe Co., Ampere, N. J., will gladly send data and prices on Lock Joint reinforced concrete pipe for pressure, culvert, subaqueous or sewer installations, on request.

BRASS STREET SIGNS

A catalog describing Union brass street name signs, which are constructed on practical, scientific and engineering lines, making a permanent street sign with minimum installation costs, may be secured from the Union Iron Products Co., Drawer H, East Chicago, Ind.

COVERED SLUDGE BEDS

Lord & Burnham Co., Graybar Bldg., New York, 208 S. La Salle St., Chicago, or Harbor Commission Bldg., Toronto, Ont., will gladly send complete data regarding Lord & Burnham Master Construction glass-overs for sludge beds.

A PRACTICAL DEMONSTRATION OF FLOW METERS

The Brown Instrument Co., 3492 Wayne Ave., Philadelphia, Pa., will be pleased to send a card about the size of a postcard which gives a practical demonstration of the workings of the Brown Electric Flow Meter, which measures the flow of liquids in pipes. Catalog 21 and Bulletin 80-15 tell the complete story of this effective flow meter.

CONCRETE STREETS AND ROADS

Information regarding concrete streets and roads, which are durable, safe and smooth-riding, may be secured without obligation from the Portland Cement Assn., 33 W. Grand Ave., Chicago, Ill.

A NEW PIPE HANDBOOK

The United States Pipe & Foundry Co., Burlington, N. J., will be pleased to send to interested city officials a copy of the new de Lavaud Handbook, which gives complete information on de Lavaud cast iron pipe, which is light in weight and easy and inexpensive to handle.

ASPHALT PAVEMENTS

Complete data regarding Westphalt, which is a hot-laid pavement without a hot-mix plant, may be secured without obligation from the West Process Pavement Co., Inc., Louisville, Ky., Harrisburg, Pa., or Richmond, Va.

CORROSION-RESISTING VALVES

Complete data on Michigan valves, made of Meehanite processed iron, which gives them superior strength, higher resistance to corrosion, freedom from spongy regions, and a higher degree of pressure tightness, may be secured free on request from the Michigan Valve & Foundry Co., Detroit, Mich.

Make the New Year

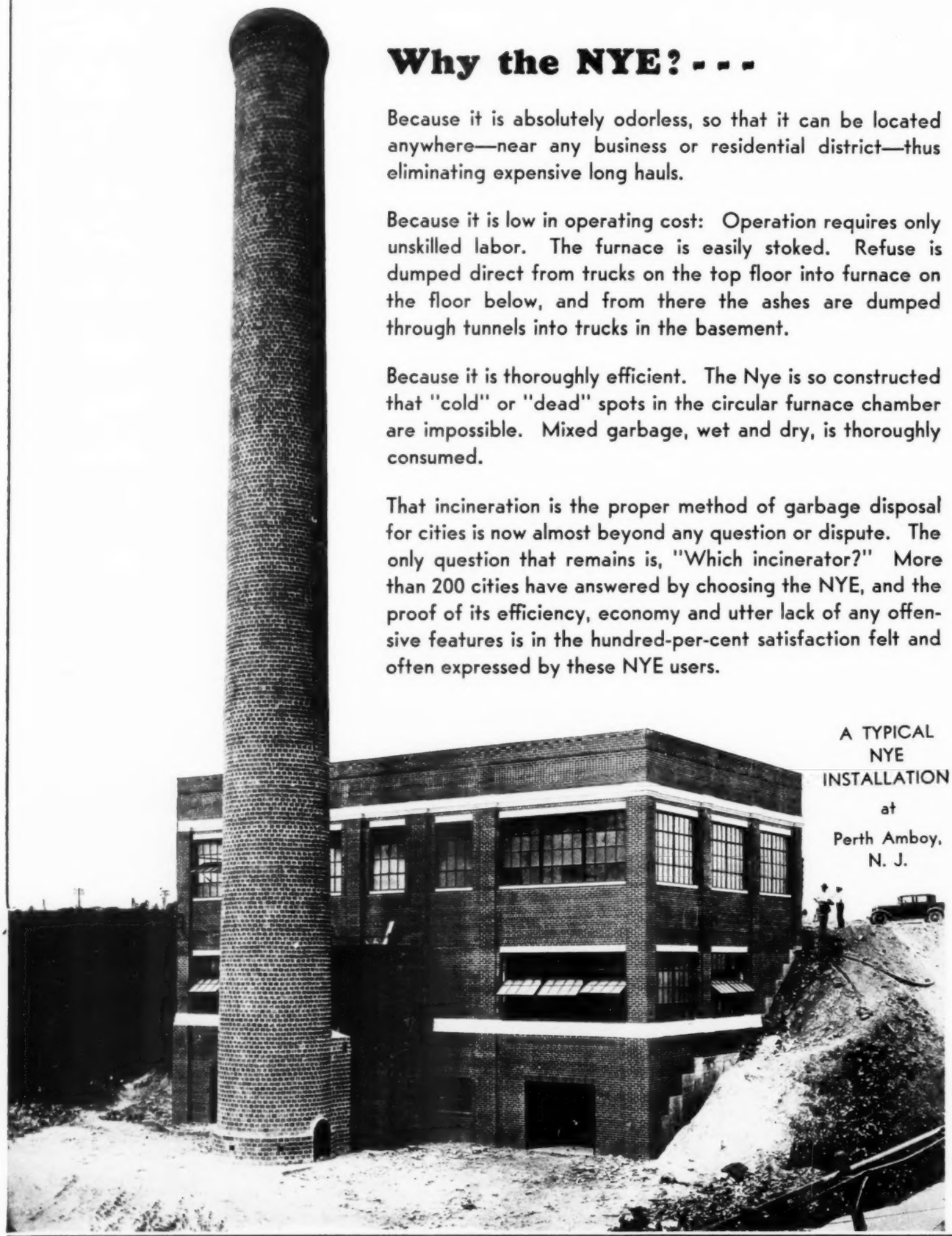
Why the NYE? - - -

Because it is absolutely odorless, so that it can be located anywhere—near any business or residential district—thus eliminating expensive long hauls.

Because it is low in operating cost: Operation requires only unskilled labor. The furnace is easily stoked. Refuse is dumped direct from trucks on the top floor into furnace on the floor below, and from there the ashes are dumped through tunnels into trucks in the basement.

Because it is thoroughly efficient. The Nye is so constructed that "cold" or "dead" spots in the circular furnace chamber are impossible. Mixed garbage, wet and dry, is thoroughly consumed.

That incineration is the proper method of garbage disposal for cities is now almost beyond any question or dispute. The only question that remains is, "Which incinerator?" More than 200 cities have answered by choosing the NYE, and the proof of its efficiency, economy and utter lack of any offensive features is in the hundred-per-cent satisfaction felt and often expressed by these NYE users.



A TYPICAL NYE INSTALLATION at Perth Amboy, N. J.

a NYE YEAR!

How, when and where:---

The first step:—Investigate. Write for a copy of our illustrated booklet, "The NYE Leads." Write to some of the cities that have installed a NYE, and find out if they are satisfied. Visit a nearby NYE plant, if possible.

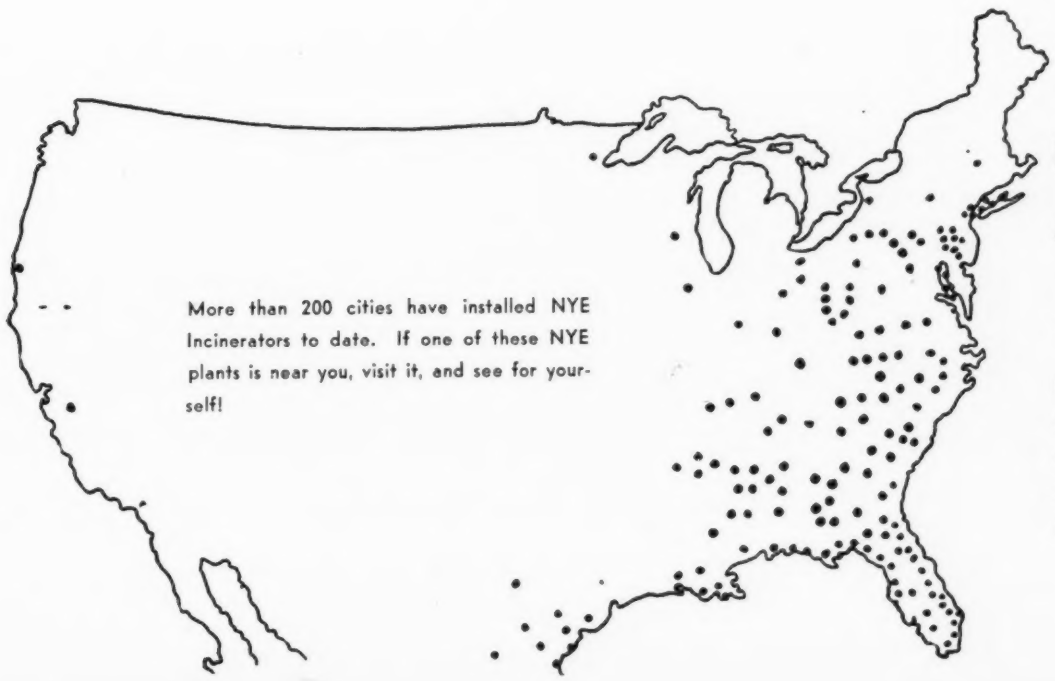
When to install:—Promptly, so that your city may begin to reap the benefits as soon as possible.

Where:—Practically anywhere within the city limits. Save the time and expense involved in long hauls by having your incinerator built in a handy nearby location. Positively no odors will escape to offend the most delicate of nostrils.

Nye service:—Nye service does not end when the incinerator is built. Our engineers take pride in cooperating with cities in the proper maintenance and operation of their NYE incinerators. Incinerators need servicing, just as automobiles do. To get the best possible results, let our engineers cooperate with YOUR city in this year 1931.

Partial list of users of NYE ODORLESS INCINERATORS

New Dorp, S. I., N. Y.
Clifton, S. I., N. Y.
High Point, N. C.
Jackson, Miss.
Ashland, Ky.
Beverly Hills, Calif.
Sarasota, Fla.
Norfolk, Va.
Covington, Ky.
Tallahassee, Fla.
Raleigh, N. C.
Portland, Ore.
Los Angeles, Calif.
Jacksonville, Fla.
Hendersonville, N. C.
Williamsport, Pa.
Oak Park, Ill.
Lynchburg, Va.
Tampa, Fla.
Miami, Fla.
Orlando, Fla.
Spartanburg, S. C.
Houston, Texas
Greensboro, N. C.
Lexington, Ky.
Mineola, N. Y.
Duluth, Minn.
White Plains, N. Y.
Youngstown, Ohio
Long Beach, N. Y.
New Brunswick, N. J.
Winston-Salem, N. C.
Perth Amboy, N. J.
Baton Rouge, La.



More than 200 cities have installed NYE Incinerators to date. If one of these NYE plants is near you, visit it, and see for yourself!

NYE ODORLESS INCINERATOR COMPANY

ALBANY, GA.

SALES OFFICES

New York City
50 East 42nd St.

Los Angeles, Calif.

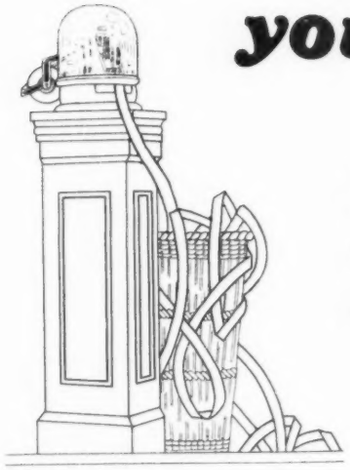
Chicago, Ill.

Cincinnati, Ohio.

San Antonio, Texas

Memphis, Tenn.

Wouldn't this distress you?—



(A stock purchased at 100 that has now dropped to 25)

How about this?—

(A city's expensive investments in watermains now delivering 25-50% of their normal carrying capacity owing to their clogged condition)

Stock that has dropped from 100 to 25 often has a way of starting to climb again. Today's 25 may be next year's 125.

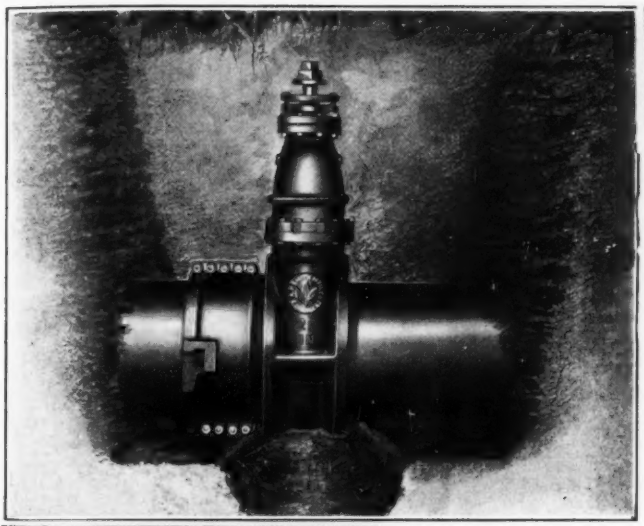
No need to worry, either, if water-main pressure is away below par because deposits on the pipe linings impede the flow and reduce the effective diameter of the pipe. For there's a remedy—an efficient and economical one—THE NATIONAL METHOD of Water Main Cleaning—which guarantees to restore the mains to 95 per cent of their original carrying capacity, at small expense, and without injury to the pipe. If you have not already investigated it, do so now. Then if the problem has not already arisen in your city, you'll be ready to meet it when it does arrive.

When the flow is slow
REMEMBER

THE NATIONAL METHOD

24 years of successful experience
in the waterworks field

NATIONAL WATER MAIN CLEANING CO.
HUDSON TERMINAL BLDG.
NEW YORK CITY



WITH THE LINE UNDER FULL PRESSURE!

VALVES INSERTED WITH SPEED & ECONOMY

"That's where we should have a new valve," says the city engineer, pointing at his map.

"But we can scarcely cut off water from that big section of the city while we install it," says the councilman who is chairman of the public works portfolio.

"Oh, you don't understand," continues the C. E. "We'll just take a A. P. Smith Inserting Machine out there and we'll have the job completed in a day, from tearing up the pavement to restoring traffic at the place over new pavement—all with full pressure on! It will be easy, quick and, what's more, not at all costly."

And he made good on his word—of course.

SMITH INSERTING MACHINES

—are today standard equipment in most waterworks departments. They are made in five sizes to take care of valve-insertions from 4" to 30." The smaller machines are sold outright. The largest machines are usually rented and skilled A. P. Smith operators go along with them.

We would be glad to furnish full descriptions, with pictures, of the operation of these machines together with names of the cities in your territory, right near you, which have been using them for years.

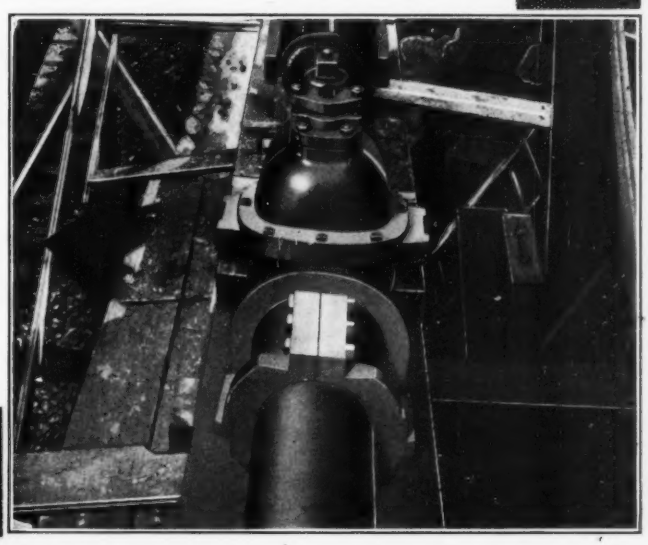
THE A.P. SMITH MFG. CO. EAST ORANGE, N.J.

Smith Tapping Apparatus—Tapping Sleeves and Valves—O'Brien Hydrants—Valve-Inserting Machines—Lead-Melting Furnaces Removable Plugs—Pipe-Cutting Machines—Corporation Tapping Machines—Corporation Cocks of Every Type—Federal Meters

ILLUSTRATIONS

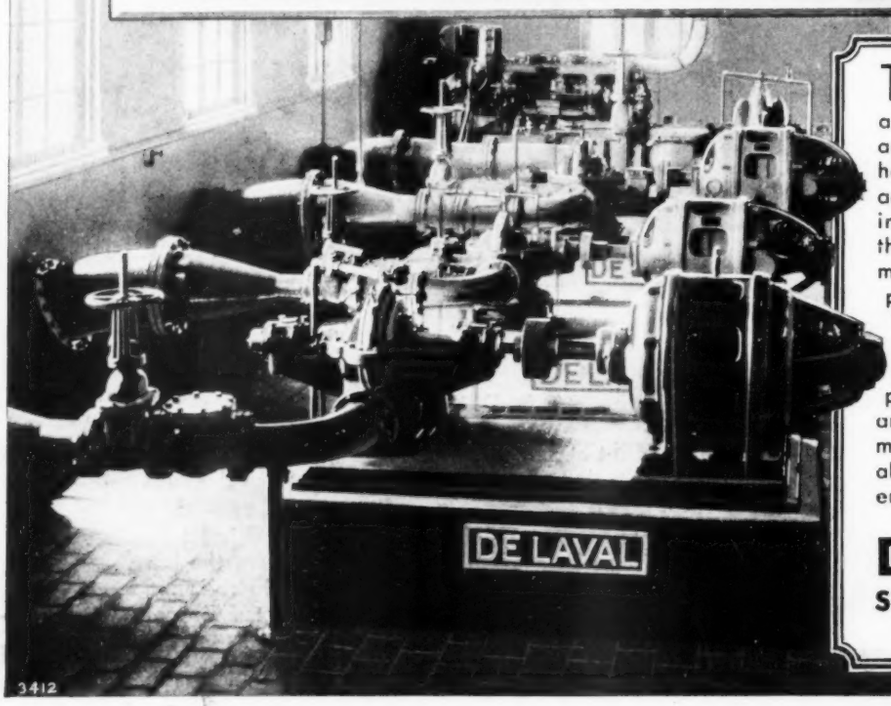
Above: Completed 20" Valve Insertion in Trench.

At Right: Valve Insertion at Inaccessible Point in Railroad Cut.



THE A.P. SMITH MFG. CO. *East Orange, N.J.*

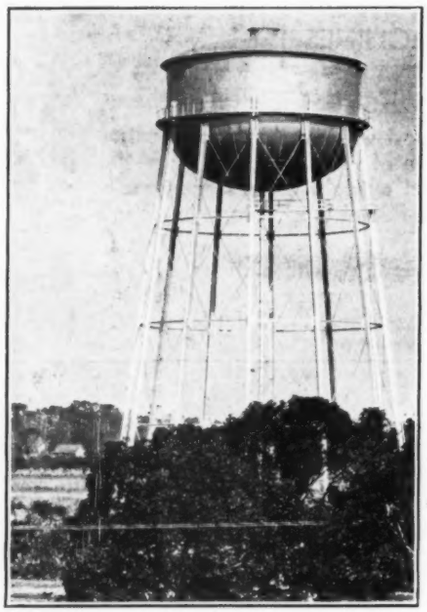
FORT LAUDERDALE, FLA. USES DE LAVAL PUMPS



THE new water supply system of Fort Lauderdale, Fla., converts a well water of high color, disagreeable taste and considerable hardness into a softened, filtered, aerated, carbonated and chlorinated supply, which is forced through 40 miles of distributing mains by the DeLaval centrifugal pumps shown in the photograph. Two of the units are rated at 1000 gal. per min. each, one at 2000 gal., and one at 3000 gal., all pumping against 200 ft. head and being driven by 4000 volt motors. The largest pump can also be driven by a gasoline engine in periods of emergency.

DE LAVAL
STEAM TURBINE CO.
Trenton, N. J.

3412 AD-4029



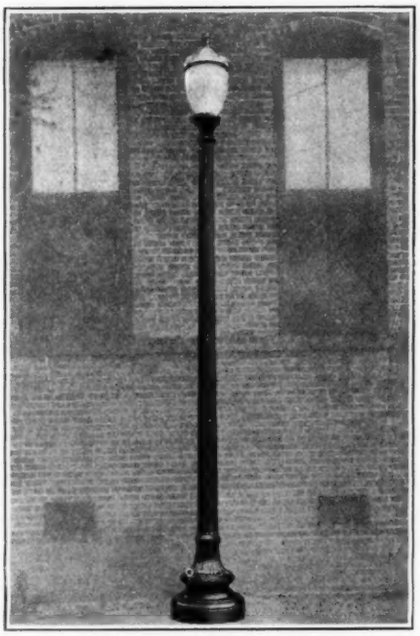
500,000 GALLON TANK
A tank beautiful, built for the "City Beautiful," Orlando, Fla.

SCHOFIELD SPECIALS
Water tanks and towers
Standpipes
Plate, sheet and steel structural work Boilers
Engines

Simple
Beautiful
Durable
WATER TOWERS
and
MUNICIPAL
CASTINGS

SCHOFIELD PRODUCTS have a 78-year reputation for RELIABILITY. In 22 years more, we'll make it a hundred! Is it any wonder that SCHOFIELD'S keeps on making its water tanks and towers and municipal castings the very best that can be produced?

J. S. SCHOFIELD'S SONS CO.
MACON, GA.



CUT IN STANDARD
Built for City of Washington, D. C.

SCHOFIELD SPECIALS
White-way lamp posts
Meter boxes
Park benches
Sewer castings
Anti-rattle manhole rings and covers

Storm Sewer Ideas are changing— Latest Facts point way to increased use of ARMCO *Corrugated* PIPE

For many years of trouble-free, dependable drainage: Storm sewer of Armco Corrugated Pipe being installed at Oakland, Calif.

Adding to the value of subdivision property: Armco Corrugated Pipe serving Detroit, Michigan, as stream enclosure.

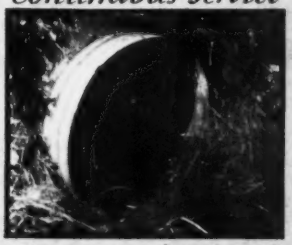
Sixty-inch Armco Corrugated Pipe being installed near Middletown, Ohio—to insure adequate, continuously-effective water disposal for decades.

FACED with the latest facts, city officials, engineers and contractors are changing their ideas about storm sewers. City after city is replacing old-fashioned, costly, troublesome pipe with continuous-length, tightly-joined, durable Armco Corrugated Iron Pipe.

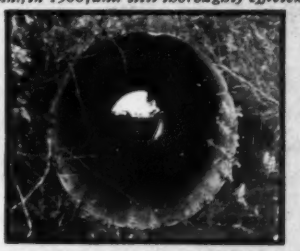
These facts pointed the way for a closer look into "causes" of unnecessary street repair and storm sewer replacement. City officials and engineers found that Armco Corrugated Pipe, champion of endurance throughout 25 years of continuous service under all storm sewer conditions, does not crack or break and is easily installed without waste and at small cost.

For efficiency and economy, additional cities are turning to Armco Corrugated Pipe in 1931. Facts which caused them to change their ideas about storm sewers, as well as other up-to-date data on Armco costs, methods of installation, etc., assembled in the great library at Drainage Headquarters, are yours for the asking. Mail the coupon to the Association or to the nearest member company.

ARMCO *Corrugated* PIPE *Celebrates 25 th Year of Continuous Service*



In service 25 years to date: Armco Corrugated Pipe installed in Redwood County, Minn., in 1906, and still thoroughly efficient.



Armco Corrugated Pipe durability is illustrated by the quarter-century service of this veteran, placed in service in Darke County, Ohio, in 1906.

ARMCO

GENTLEMEN:

Send latest facts that are causing cities to change to storm sewers of Armco Corrugated Pipe.

I am ☐ an Engineer ☐ Contractor ☐ City Official

Name .....

Address .....

© 1931, A.C.M.A. A.C.1

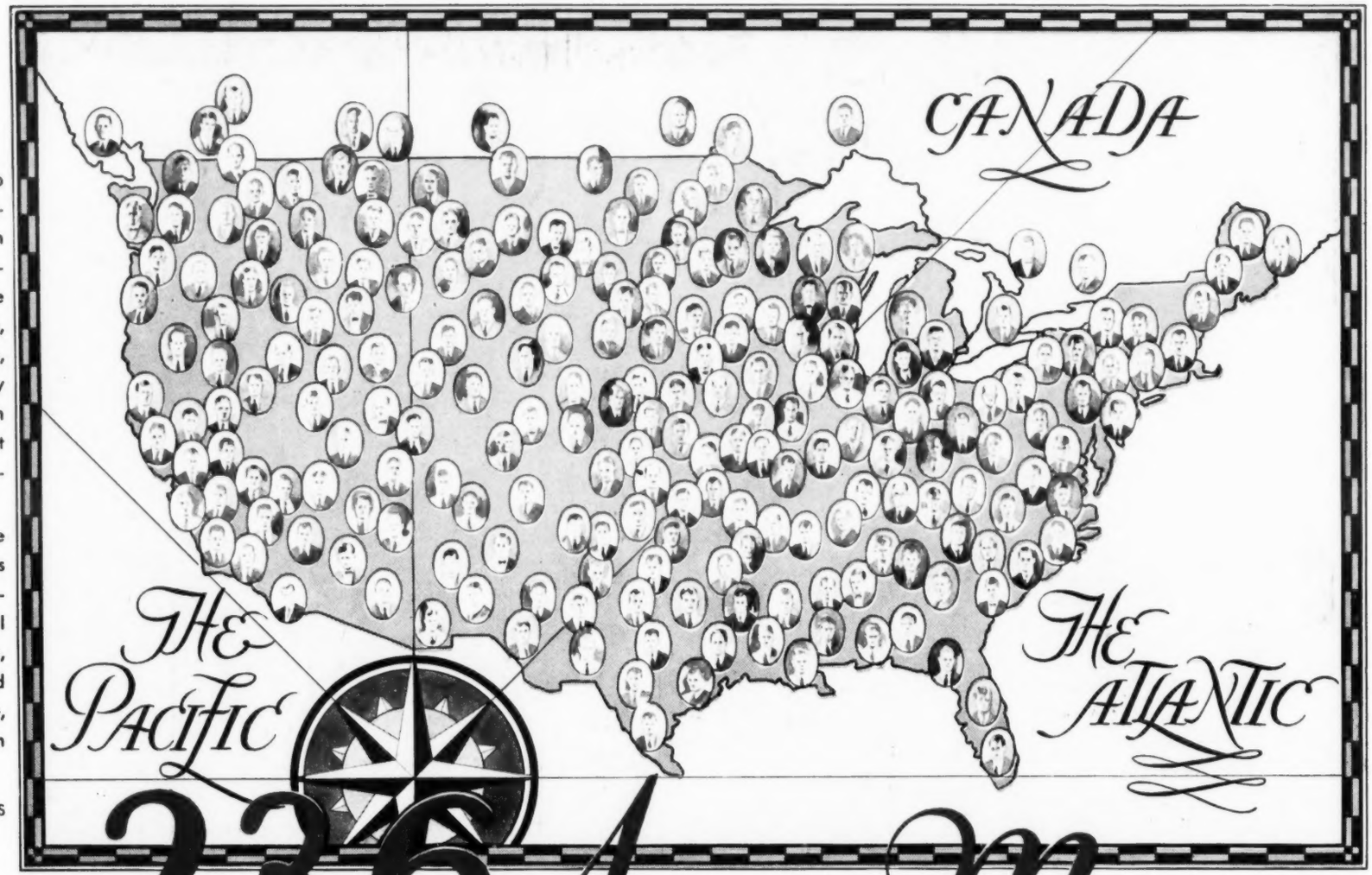
ARMCO *culverts and drains are manufactured from the Armco Ingot Iron of The American Rolling Mill Company and always bear its brand*

ARMCO CULVERT MANUFACTURERS ASSOCIATION, *Middletown, Ohio*

THIS group of Armco specialists is the largest of its kind in the world. Its members, working in all parts of the United States and Canada, have gained their experience, knowledge and reputation by working in close harmony with the country's leading street planners, engineers and public officials.

You are invited to make use of the broad, helpful facilities offered by the Armco organization. To make a personal investigation of storm sewers, to judge various types and kinds of products in service, fill in and mail the coupon on the reverse side.

ARMCO CULVERT MANUFACTURERS ASSOCIATION
Middletown, Ohio



236 Armco Men

EXPERIENCED IN DRAINAGE — STAND READY TO WORK WITH ENGINEERS, CONTRACTORS, AND CITY OFFICIALS ON ANY DRAINAGE PROBLEM . . . . . .

When?

The inevitable future replacement job—how far off is it?

That's the one big consideration in choosing a valve. Thousands of Ludlows twenty years old, even thirty, forty—are still in service.

The LUDLOW VALVE Manufacturing Co.

TRADE MARK

TROY N.Y.

3508

During January we hope you will remember to mention THE AMERICAN CITY

KENNEDY

VALVES~PIPE FITTINGS~FIRE HYDRANTS

Gate, Globe, Angle and Check Valves furnished for a wide range of sizes and pressures, and arranged for manual, gear, cylinder, or electric operation. Water Gates and Fire Hydrants built to American Water Works Association specifications. Underwriters' approved Gate Valves and Post Indicators. Cast Iron Flanged Fittings and Flanges, Malleable Iron and Brass Screwed Fittings. *Send for Catalog*

THE KENNEDY VALVE MANUFACTURING CO. ELMIRA, N. Y.

New York City Chicago San Francisco Philadelphia Cleveland Atlanta El Paso Salt Lake City Los Angeles Seattle

Patent Applied for

COOK

Deep-Well Turbine

SELF-OILING—WEATHERPROOF

This is the Pump YOU have been hoping for—

Fool-proof — Trouble-proof

Compact

Sturdy

Efficient

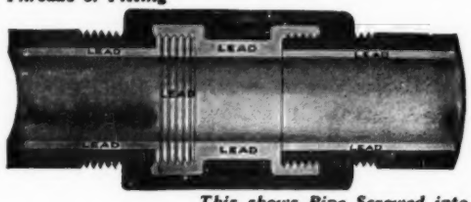
Adaptable

Bulletin 36

A. D. COOK, INC.

Lawrenceburg Indiana

This shows Pipe just entering Lead Threads of Fitting



This shows Pipe Screwed into Lead Threads and Shoulder of Fittings

For Dependable Service Installations

"Wakefield" Galvanized

Amalgamated Lead Lined Iron Pipe and Fittings

Low Cost—Easily Installed—Permanent

Inquiries respectfully solicited

LEAD LINED IRON PIPE CO., Wakefield, Mass.

The EDDY Hydrant

Eddy Fire Hydrants have many points that appeal to water-works men. For example:

A damaged valve can be replaced in a few minutes at slight expense.

Should the standpipe be broken, not a drop of water need be lost.

All hydrants are frost-proof.

These and many other points of excellence are thoroughly explained in our catalog, which it will pay you to study.

Also manufacturers of the well-known Eddy Valves

EDDY VALVE COMPANY

WATERFORD NEW YORK

Western Agents:

James B. Clow & Sons, Chicago, Ill.

INTERNATIONAL

WATER PURIFICATION PLANTS

THROUGH the years, the International Filter Co. has been the first to adopt improvements, the first to discard features that have proved hindrances of progress. The result has been that International equipment has maintained its leadership; that it is first now as always.

INTERNATIONAL FILTER CO.

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DONALDSON IRON CO.

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Manufacturers of

CAST IRON PIPE

FOR WATER AND GAS

ALSO SPECIAL CASTINGS AND FLANGE WORK

The offices of THE AMERICAN CITY, 470 Fourth Avenue, N. Y., are headquarters for information on equipment for municipal work. If you want catalogs, prices or names of manufacturers, let us help you.

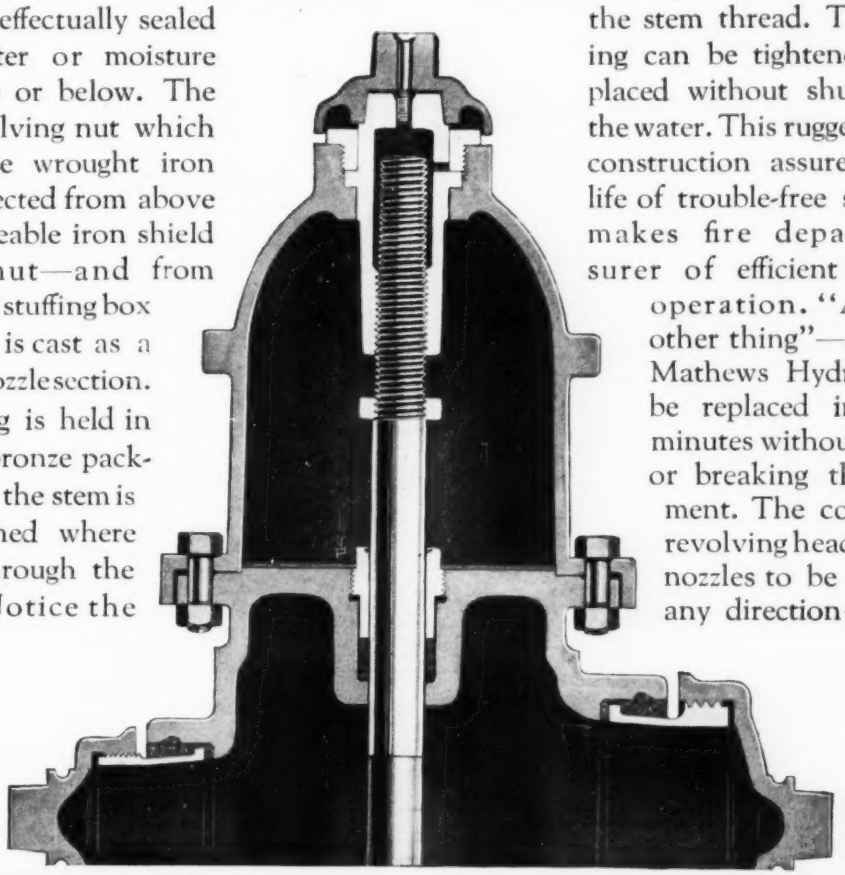
The OPERATING THREAD of the

MATHEWS MODERNIZED HYDRANT

Reg. U. S. Patent Office

IS SEALED . . . NO MOISTURE CAN REACH IT . . .

No frozen threads—no threads stuck or destroyed by rust—because the Operating Thread of the Mathews Modernized Hydrant is effectually sealed against water or moisture from above or below. The bronze revolving nut which operates the wrought iron stem is protected from above by the malleable iron shield operating nut—and from below by the stuffing box plate which is cast as a part of the nozzle section. The packing is held in place by a bronze packing nut, and the stem is bronze bushed where it passes through the packing. Notice the generous length of the operating thread. At the full open position, the revolving nut thread is completely in contact with the stem thread. The packing can be tightened or replaced without shutting off the water. This rugged, simple construction assures a long life of trouble-free service—makes fire departments surer of efficient hydrant operation. "And another thing"—a broken Mathews Hydrant can be replaced in a few minutes without digging or breaking the pavement. The completely revolving head enables nozzles to be faced in any direction—easily.



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VALVE BOXES
FLOOR STANDS

R. D. WOOD & CO.

In business continuously since 1803

400 Chestnut Street :-: Philadelphia

CAST IRON PIPE
SAND SPUN
(centrifugally cast)
and PIT CAST
Reg. U. S. Pat. Off.

VOGT BROTHERS
TRAFFIC MODEL
FIRE HYDRANT

"Traffic Smash-ups"

—Solved—

By this hydrant—

Back on the job—quicker — easier —

No replacing of large, expensive parts—

No digging—

Details?—Yours for the asking

VOGT BROTHERS MFG. CO.
INCORPORATED
LOUISVILLE · · KENTUCKY
Manufacturers
"Aer-o-mix" AERATOR MIXER

CHEMICALS

for Water Purification — *for* Treatment of Sewage

Liquid Chlorine

Single Unit Tank Cars — *Multi-Unit Tank Cars (1-Ton Containers)*

150-lb. Cylinders

Sulphate of Alumina
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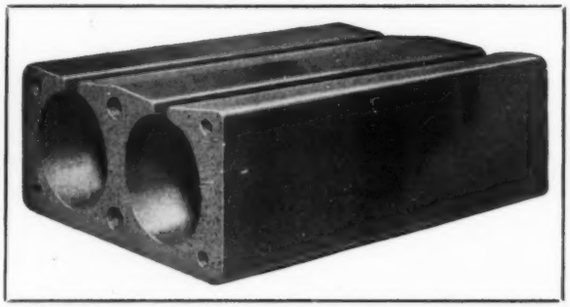

SINGLE-UNIT, GLAZED, VITRIFIED BLOCKS FOR AERATION & DRAINAGE OF TRICKLING FILTERS

Write for information and prices

WM. E. DEE COMPANY, 1233 Wabash Ave., Chicago, Ill.

THE STANDARD FOR 50 YEARS

Automatic Pressure Control Valves
Feed Water Filters — Portable Fire Hydrants
Hydraulic Engines — Hydraulic Booster Pumps

ROSS VALVE MFG. CO., INC.

ARCHIBALD STREET — TROY N. Y.

Lock Joint Pipe Co. *Est'd 1905* Ampere, N. J.

SIMPLEX VENTURI TYPE METERS

ACCURATE—RELIABLE—SIMPLE—EASY TO CHECK AND ADJUST

Write for Bulletins

SIMPLEX VALVE & METER CO. 6743 Upland St., Philadelphia, Pa.

Manufacturers of Meters and Controllers of Venturi Type; Gauges; Air and Vacuum Valves; Air Release Valves; and other Water-Works Devices

How far is it to COBBS-CORNERS?

A CLOW-NATIONAL salesman stops at the little places, as well as the big cities. You see him at least three or four times a year, or oftener. If he sold only pipe, he would see you only when you wanted pipe—perhaps once a year or less. Instead, he sells "everything for a pipe system" and therefore can afford to keep in close touch with you.

He covers more territory—covers it oftener and with a more complete line of pipe system materials than any other in his line of business. This means a service to those who trade with him, that can be secured nowhere else.

You develop confidence in each other—the only basis for a business transaction. You learn the simplicity and economy of ordering everything you need for a pipe system from one manufacturer . . . better delivery, less office detail work . . . assurance of good service . . . a company that will be asking you for more business within a month or so, therefore, more than eager to give you complete satisfaction now.

National Cast Iron Pipe Co.
Birmingham, Alabama

James B. Clow & Sons
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CLOW-NATIONAL
CAST IRON PIPE
"Everything for a Pipe System"

WATEROUS

RUGGED FIRE HYDRANTS

Fire hydrants are seldom used yet they are quite often abused. Traffic mishaps, use by unauthorized persons, neglect, etc., are the reasons why Waterous Hydrants are ruggedly constructed throughout. They are dependable ALWAYS! Our latest catalog sent on request.

Waterous Dependable

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WATEROUS COMPANY
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SOUND DESIGN

Cast Iron Pipe

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Cast Iron Pipe and Special Castings, Bell and Spigot, Flange, Flexible Joint, Culvert, Milled and Plain End Tubes, Cylinders, Flanged and Bell and Spigot Fittings, High Pressure Fire Service Pipe, Warren Short Body Specials.

Sizes 2- to 60-inch

Pipe manufactured in accordance with standard specifications adopted and approved by water works associations and engineers.

Warren Foundry & Pipe Co.

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Sales: **Bowling Green Building, New York City**
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The Stamp of Quality

PAVING of the HIGHEST STANDARD

Is assured if Hunt Field Superintendence is used. Every car of bituminous binder, cement or brick is sampled and tested and each detail of the actual laying supervised. Field laboratory control of the asphalt mix is furnished. Hunt Inspection costs little. It pays for itself many times.

May we send you more information?

ROBERT W. HUNT COMPANY

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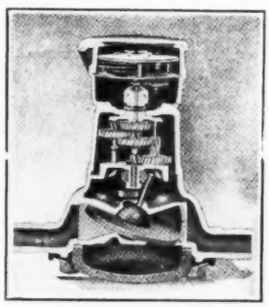
INSURANCE EXCHANGE
CHICAGO, ILL.
With offices in all large cities.

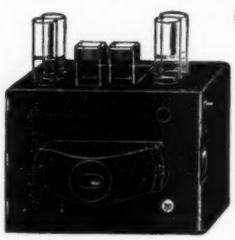


"Meters of Merit"

PHOENIX DISK METERS are made by a Company that confines itself exclusively to the making of *Water Meters of Merit.* Phoenix Meters are specially noted for their rugged simplicity and for the absence of screws. *This means few-and-far-between repairs.*

Phoenix Meter Corp.
50 CHURCH STREET NEW YORK

For HYDROGEN ION CONTROL



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Use Modern Hellige Comparators

with PERMANENT NON-FADING COLOR GLASS STANDARDS which avoid the time and money wasting preparing, rechecking or replacing of liquid comparison standards.

Complete apparatus $15.00 and up

For detailed information write for new lists Nos. 600 and 601

HELLIGE-KLETT, INC.
179 EAST 87TH STREET NEW YORK

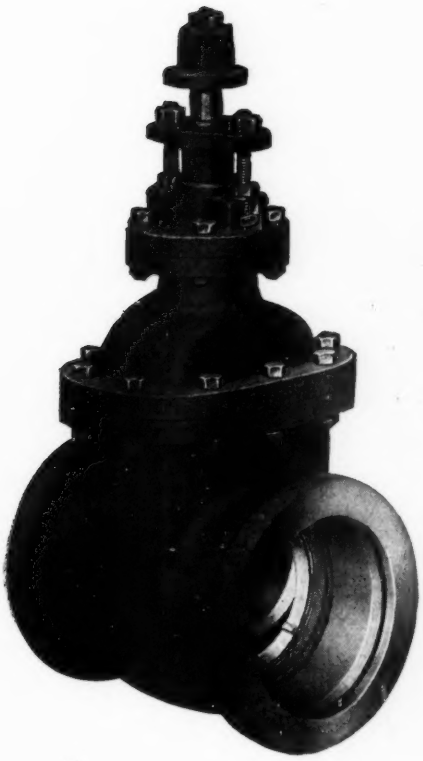
ECONOMY is a distinctive virtue

—Burke

Economy—

2. Management of the affairs of a community—directly concerned with its maintenance or productiveness.

—as defined by Webster



DARLING
GATE VALVES

IF any community is to prosper as it should, economy is not only a distinctive virtue—it's an absolute necessity.

One of the most important factors is the service obtained from equipment over a period of many years. On this basis of long service, Darling Valves have established an enviable reputation.

Darling Gate Valves are sturdily constructed on sound mechanical principles. An exclusive feature is the revolving gate discs. They seat in a new position at each closing, which prevents scoring and wearing of ridges on discs and seat faces. There are no ribs, guides, shoulders, corners or pockets to catch scale or sediment, which might interfere with the operation of the valve. Even the largest Darling Valve can be easily operated by one man.

These are but a few of the many reasons for the perfect seal, even wear and long life of Darling Gate Valves. A request will bring complete particulars.

Darling Valve & Mfg. Co.
Williamsport, Pa.

New York Los Angeles Oklahoma City Houston

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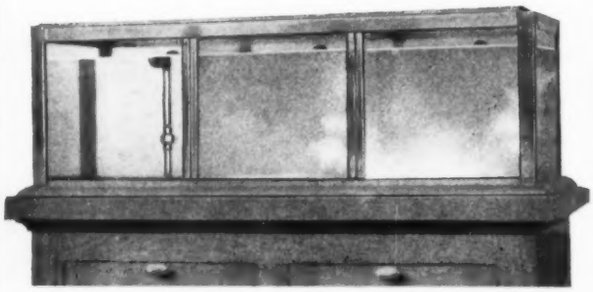

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HALL COMPARITOR

Entirely new! Makes every stage of water purification process, easily, quickly and centrally visible. Makes plant operation easier and more efficient. Convincingly demonstrates to public the need of water purification. Send now for circular and full information.

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REINFORCED CONCRETE PIPE
"It makes a better joint"

Easily laid at small expense with perfect flow line

NEWARK CONCRETE PIPE CO.
323 Broadway
NEWARK, N. J.

MUNICIPAL
MIXED REFUSE
INCINERATORS

— HILER —
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Water Meters
Compounding Valves
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Water Pressure Regulators
Presses for Lining Service Pipe with Cement

Union Water Meter Co.
Worcester, Mass.
Incorporated 1868

EBC

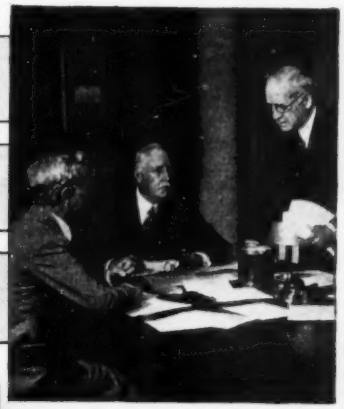
Liquid Chlorine

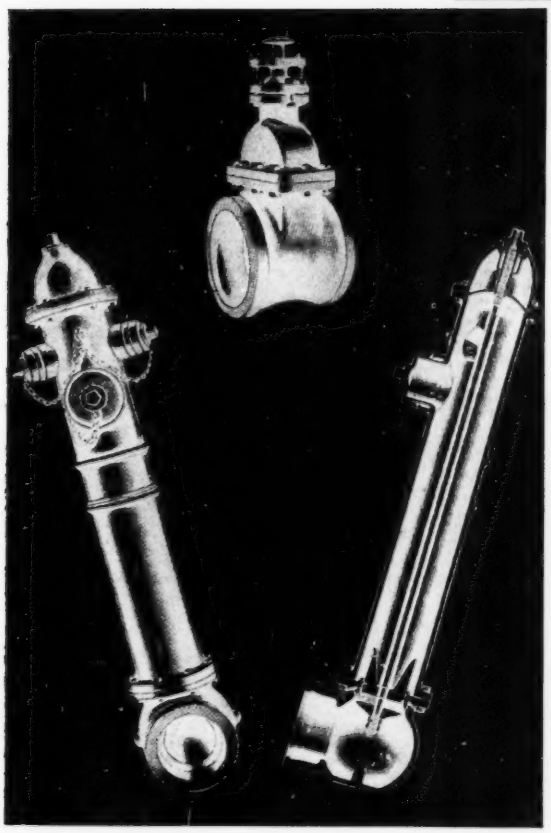
for Sterilization of Water—
Disinfection of Sewage

Look for the RED Cylinder

Electro Bleaching Gas Co.
PIONEER MANUFACTURERS of LIQUID CHLORINE
Plant NIAGARA FALLS, N.Y.
New office 9 East 41st Street New York

For years he bought hydrants and valves ...*then he built them*





MR. H. M. LOFTON, the founder of this business, has been on both sides of the desk. For years as Superintendent of Water Works in a large southern city he was responsible for the purchase, operation and maintenance of fire hydrants and valves.

When he began to *build* them he tackled the job from the *buyer's* angle. He knew what the equipment should do and he had definite ideas as to certain practical and necessary improvements.

A valve that would *always* work because the stem couldn't jam or break. A valve that would *never* leak due to pressure being applied equally from four separate points. A valve that would *always* be in alignment due to the slow, patient "aging" of all castings to prevent shrinkage and internal strains.

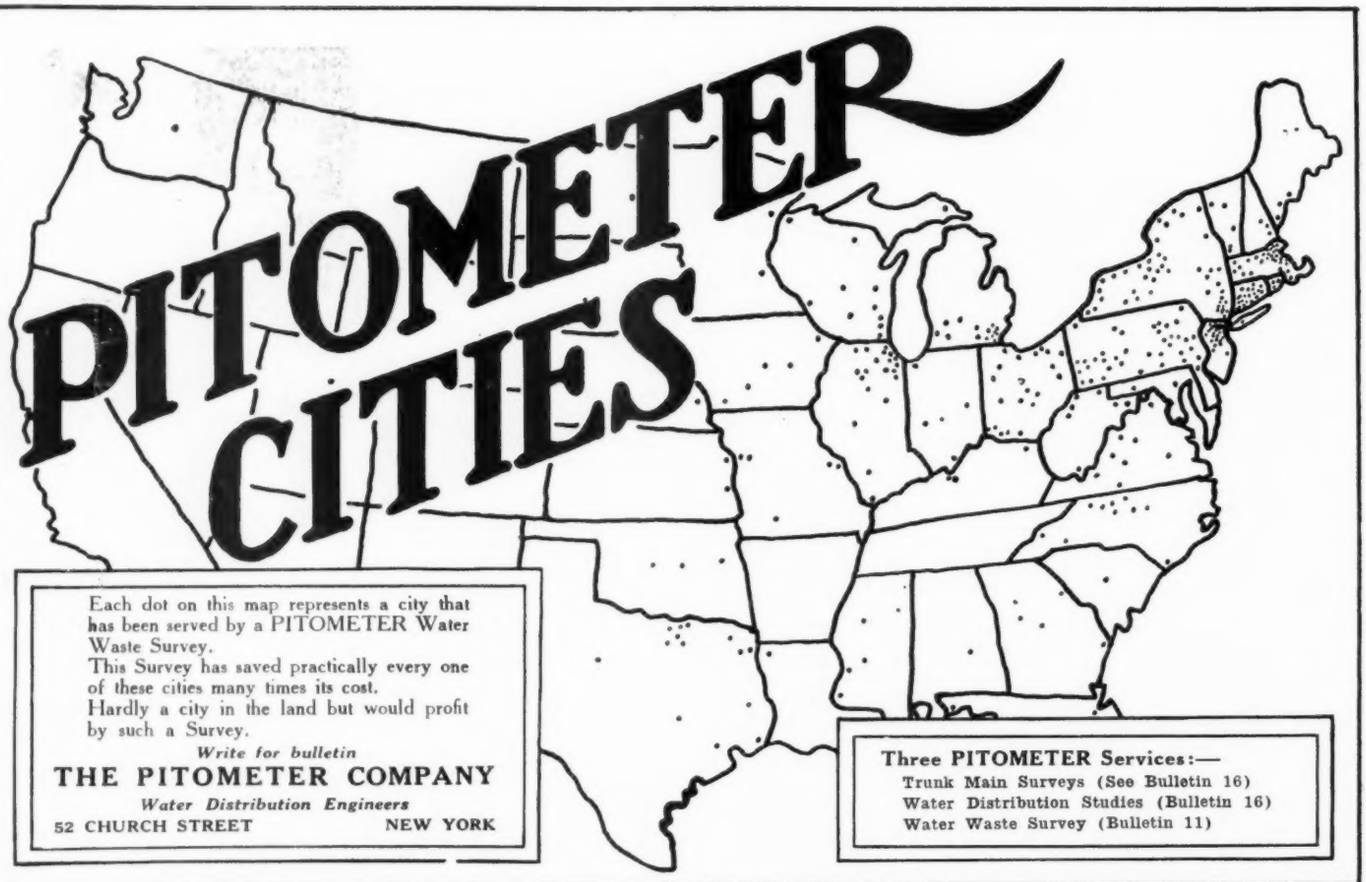
It is these improvements, based on a quarter century of experience and guided by sound engineering design, that have made the name COLUMBIAN on hydrants and valves mean assured performance . . . greater ease and economy in repairs and replacements . . . longer life.

Write for the Columbian folder!

It is full of helpful information to every executive who is responsible for the purchase, operation and maintenance of fire hydrants and valves. May we mail you a copy?

Columbian
IRON WORKS
CHATTANOOGA, TENNESSEE

PITOMETER CITIES

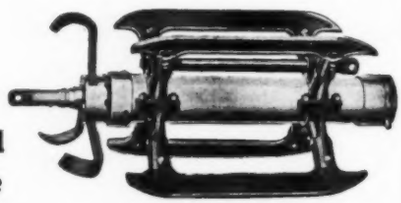


Each dot on this map represents a city that has been served by a PITOMETER Water Waste Survey.
This Survey has saved practically every one of these cities many times its cost.
Hardly a city in the land but would profit by such a Survey.

Write for bulletin

THE PITOMETER COMPANY
Water Distribution Engineers
52 CHURCH STREET NEW YORK

Three PITOMETER Services:—
Trunk Main Surveys (See Bulletin 16)
Water Distribution Studies (Bulletin 16)
Water Waste Survey (Bulletin 11)



Standard Turbine Adjustable to clean sewers from 6-inch to 30-inch

Our standard turbine illustrated above is operated by water pressure and is pulled through the sewer with our specially designed windlass.

The turbine head, in which three knives are fastened, revolves at 600 r.p.m. at 60 pounds pressure, and develops 3 hp. at the cutting knives.

The knives have a helical cut and clean top, bottom and sides of the sewer in one operation. The same water used to propel the knives serves to clean and scour the sewer at the point where the knives are cutting.

Write for our new catalog

THE TURBINE SEWER MACHINE COMPANY
Mfrs. All Types Sewer Cleaning Apparatus
5210 State Street Milwaukee, Wisc.

NOW! the **TYPE X**

A REAL CONVENIENCE IN METER BOX COVERS

WITH the Type X Meter Box Cover, the lid is unlocked with the Ford Worm Lock which *lifts the lid and breaks the seal* of ice or dirt. Then the lid is slid forward about a half inch to a stop and leaned back. To close, the lid is simply laid down locked. *The advantages are these:*

1. Hinge effect is obtained *without openings* in lid and without any close fitting pivots.
2. *No mud, snow or leaves dragged into the meter box* when the lid is replaced as this lid stays on.
3. *Only one hand needed* in opening or closing the meter box.
4. Instead of lifting the entire lid twice, *you lift half the lid once.*

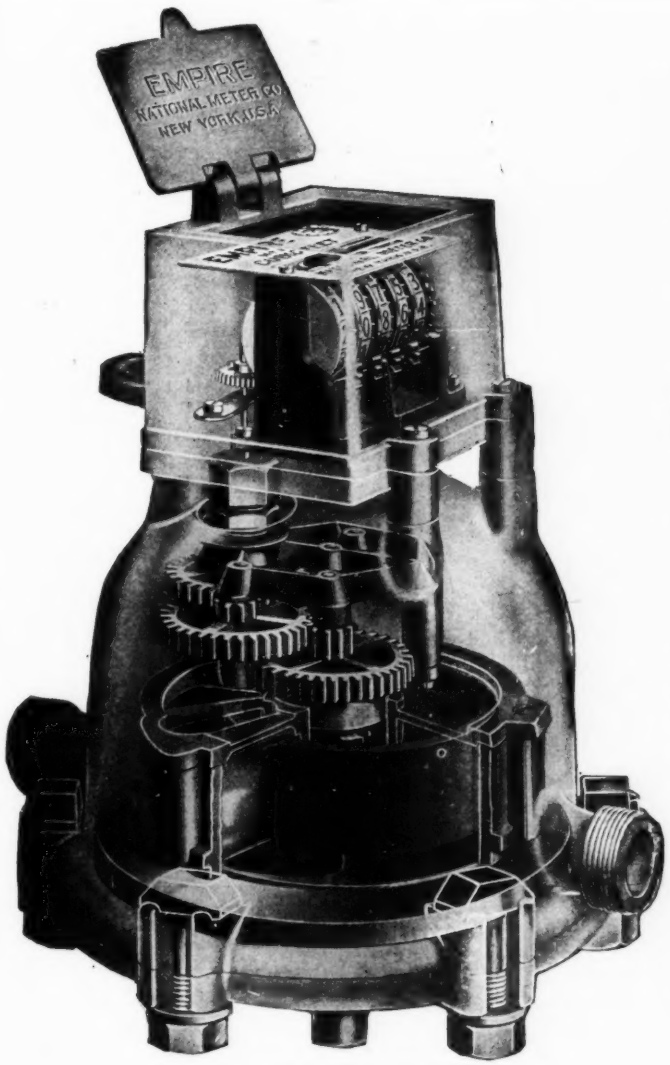
Write for Literature and Prices.

Notice neat, clean appearance of lid.

Simply slide lid forward to stop and lean it back.

11½ in. lid opening, 4 in. depth—made for 15, 18 and 20 in. tile.

The FORD METER BOX CO.
WABASH, INDIANA
WATER METER SETTING & TESTING EQUIPMENT



The EMPIRE
Oscillating Piston Meter

WATER METERS

The EMPIRE

A Meter That Keeps All Its Promises

The EMPIRE will measure more accurately, on smaller streams, and with less cost for repairs or general upkeep than any other meter. Best of all — EMPIRE accuracy lasts. The wonderful oscillating piston operates without any of the injurious side-thrust and strain that so quickly destroy the accuracy of other meters. And how durable EMPIRES are! Ten — fifteen — even twenty years of hard service, without the need of a single repair, are ordinary records for EMPIRE meters.

Made in all sizes, from ⅝-inch to 6 inches.

Information of interest to every user of meters will be found in EMPIRE circular No. 300. If you haven't already a copy, send a postal for one today—no obligation whatever.

Greetings For 1931

We thank all our good friends for the hearty support they have given us, not only during the past year, but through the many that have preceded it. We wish them, every one, the best the season affords, and—with all the good fortune that it implies—

A Happy New Year!

NATIONAL METER COMPANY

299 BROADWAY, NEW YORK

Chicago Boston Cincinnati San Francisco Los Angeles Houston

MINERALEAD

A PROVEN JOINTING MATERIAL FOR WATER MAINS

Easy Melting
Rapid Pouring
No Caulking
Tighter Joints
No Radial Cracks

G-K SEWER JOINT COMPOUND

THE ORIGINAL BITUMINOUS JOINT FOR TERRA COTTA PIPE

Permanent
Pliable
Root-Proof
Water-Tight

M-D CUT-IN CONNECTIONS

FOR MAKING HOUSE CONNECTIONS IN SEWER LINES

Saves Time and Money
Eliminates Investment in Wyes and Tees Not Used
Furnished in 45° and 90° Slant

Write for Catalog

THE ATLAS MINERAL PRODUCTS COMPANY
of Pennsylvania
MERTZTOWN PENNSYLVANIA
ESTABLISHED 1892

CAST IRON PIPE

Those Who Know
ARE KEEN ABOUT LYNCHBURG SERVICE

An enormous capacity on all items of our manufacture insures PROMPT SERVICE. . . . Write, wire, or telephone your requirements and get the thrill of "LYNCHBURG SUPERIOR SERVICE."

We Furnish
In 12-foot lengths: Bell and Spigot Water and Gas Pipe—in sizes 3 in. through 48 in.
In 16-foot lengths: Bell and Spigot Water and Gas Pipe—in sizes 4 in., 6 in., 8 in., 10 in. and 12 in.
deLavaud Centrifugal Pipe: Through to 20 in. in 12-foot lengths, and from 4 in. through 12 in., in 18-foot lengths. Bell and Spigot and all Bell Fittings from 3 in. through 48 in.

Plain End Fittings
Plain End Pipe for Dresser Couplings
Cement Lined Pipe and Fittings
Flexible Joint Pipe
Flanged Pipe from 3" through 84"
Flanged Fittings from 1" through 84"

Standard and Extra Heavy Companion, Blind and Reducing Flanges, and Miscellaneous Castings

LYNCHBURG FOUNDRY COMPANY
General Office: Lynchburg, Va.
Peoples Gas Bldg. Chicago, Ill.
50 Church St. New York, N. Y.

Send Us Your Meter Troubles

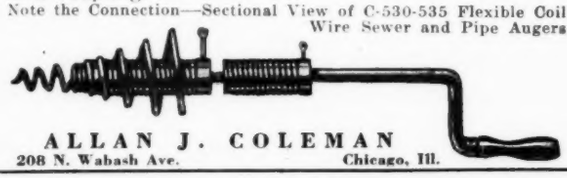
We solve them in a manner and at a cost satisfactory to you and your patrons. All makes and sizes corrected, repaired, tested, by experts.
When meters do not function properly box them and ship to us by freight or express. We will do the rest and you will be pleased.

HYDRAULIC EQUIPMENT CO.
Formerly READING METER REPAIR CO.
522 Court St. Reading, Pa.

COLEMAN'S SEWER RODS

Made of the best one-inch second growth hickory, Coleman's Sectional-Sewer and Conduit Rods in 3 or 4-ft. lengths are joined by the most improved malleable iron coupling.

Note the Connection—Sectional View of C-530-535 Flexible Coil Wire Sewer and Pipe Augers



ALLAN J. COLEMAN
208 N. Wabash Ave. Chicago, Ill.

"G"

The new Rensselaer Catalog "G" is now ready for distribution. Officials desiring the latest information on RENSSELAER VALVES and COREY HYDRANTS are invited to fill in and mail the coupon below.

RENSSELAER VALVE CO.,
TROY, NEW YORK.

Send Catalog "G" to

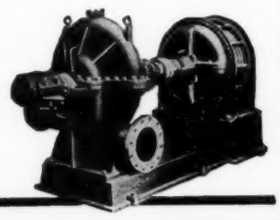
Name .....
Title .....
Street .....
City .....

MORRIS CENTRIFUGAL PUMPS

FOR water supply, unwatering, drainage, fire service, irrigation, circulating, boiler feeding, hydraulic mining, etc. We have or will build to meet any pumping conditions and for any power—belted, electric, steam or gasoline engine.

Write for Bulletin

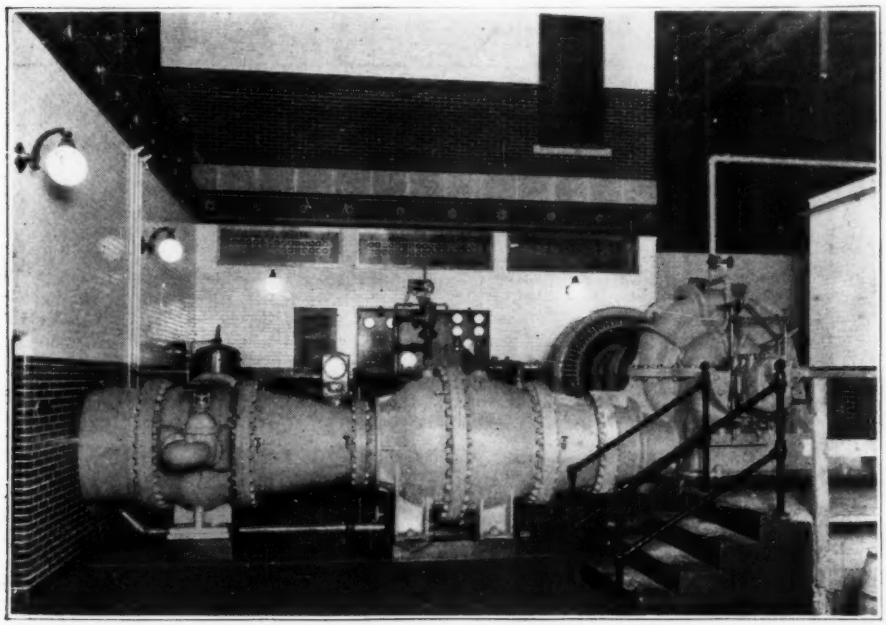
MORRIS MACHINE WORKS
BALDWINSVILLE, N. Y.



Dependable,
low cost pump performance
. . . *on large jobs and small*

Fairbanks-Morse pumping equipment has earned a reputation for reliability—a reputation that should be significant to prospective buyers of pumps for large or small jobs.

The performance record of F-M installations is founded upon two factors. First, the quality of the equipment. Back of every F-M Pump and Motor is the experience of pioneer builders and the resources of one of the world's largest pump and motor manufacturers. Second, the proper application of equipment. Fairbanks-Morse *combined* knowledge of power and pumping assures a perfect balance between units and a close application to specific problems.



The photograph shows a Fairbanks-Morse centrifugal pump installed in the Water Works Park Station at Detroit, Michigan

Fairbanks-Morse Pumps are built in many styles and capacities from deep well turbines to the huge centrifugal units which are used in Detroit (see illustration), Chicago, Philadelphia and other leading cities. Fairbanks-Morse engineers are always available for consultation.

FAIRBANKS, MORSE & CO.
900 S. Wabash Ave., Chicago
32 branches at your service throughout the United States

FAIRBANKS-MORSE
PUMPS AND MOTORS

POWER, PUMPING AND WEIGHING EQUIPMENT

EPA 95.6

"I LIKE THE PATENTED FROST BOTTOM ON THE AMERICAN METER"

Says
S. D. Hall, Supt.
Water Works Dept.
Batavia, N. Y.

"I like the patented cast iron frost bottom of the American Water Meter," says Mr. S. D. Hall, Waterworks Superintendent of Batavia, N. Y. "My experience has been, when the meter is frozen, this bottom breaks cleanly without damage to the working parts of the meter. In fact, where there is a chance of the meter becoming frozen, I would not think of setting any meter, old or new, other than an American with a breakable frost bottom."

Many hundreds of cities and municipalities, large and small, have found in the American Water Meter the solution to the problem of frozen meters. The following points of superiority are exclusive to the American frost bottom meter:

1. ***The breaking action is controlled.*** The bottom breaks all around, starting at the inlet side, then it is held from dropping out by the bolt heads. The chamber, disc and gears move with the ice and cannot be damaged.

2. ***The frost bottom breaks by tension.*** This tension is definitely controlled by the thickness of the metal at the breaking ring. Any other type of frost bottom meter breaks by a shearing action which cannot be definitely controlled.

3. ***The frost bottom is designed to break at 500 pounds ice pressure.*** The controlled thickness of the iron at the breaking ring assures a constant breaking pressure.

4. ***Factory tested at 300 pounds pressure.*** Every frost bottom is tested at the factory and must withstand a breaking pressure of 300 pounds to make certain that the bottom will not break until it is actually frozen.

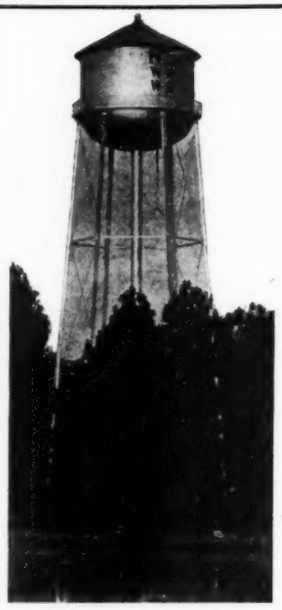
Your problem may be identical with that of the Batavia Waterworks. If so, you need the Niagara or American Water Meter. Let us tell you more about it. Send for complete information, gladly furnished without any obligation whatever.

NIAGARA (IRON CASE) and AMERICAN (BRONZE CASE) Water Meters

BUFFALO METER CO.

2902 MAIN ST. BUFFALO, N. Y.

COLE



Cole Elevated Tank erected for Mobile Water Works

Correct in Design Erected

WE are prepared to submit designs to meet any special requirements for tanks and towers whether on building, odd location or requiring auxiliary units.

COLE tanks offer very distinctive advantages in both design and workmanship. They meet the exacting requirements of all insurance authorities.

Our Engineering Department with an experience of 56 years will be glad to cooperate with you.

R. D. COLE MANUFACTURING CO.

Established 1854

NEWNAN, GA.

New York Office
5 Beekman St.

MORE WATER—LESS DRAWDOWN

Test after test, in laboratory and in field, have proved conclusively the truth of our claim that the Johnson Screen will either give more water with the same drawdown or an equal quantity of water with less drawdown than any other screen. It saves its cost many times over in pumping economy.

Special specifications of Anaconda Red Brass makes the Johnson Screen corrosion-proof.

We shall be pleased to send you our bulletins

EDWARD E. JOHNSON, INC.

2304 Long Avenue St. Paul, Minn.

UNIVERSAL CAST IRON PIPE

THE CENTRAL FOUNDRY COMPANY

420 Lexington Ave., New York City

CHICAGO
332 S. Michigan Ave.

BIRMINGHAM
Comer Bldg.

DALLAS
Praetorian Bldg.

SAN FRANCISCO
100 Potrero Ave.

5 Million Readers

...month after month will be faced with the facts about CAST IRON PIPE

Water and gas engineers will be interested to know that, during the year 1931, full page advertisements in The Saturday Evening Post, Collier's Weekly and Time Magazine will continue to inform property owners concerning Cast Iron Pipe. Long life and tax-saving durability will be the keynotes of another year of educational advertising by which The Cast Iron Pipe Research Association seeks to cooperate with engineers, contractors and public-spirited citizens.

The facts about Cast Iron Pipe will also be told in a selected list of the most important water, gas and sewage publications.

Information regarding the greater durability, and hence the greater economy, of Cast Iron Pipe can be obtained by addressing: Thomas F. Wolfe, Research Engineer, The Cast Iron Pipe Research Association, 309 Peoples Gas Building, Chicago, Illinois.

The Cast Iron Pipe Research Association is a service organization of leading pipe founders, formed to promote the scientific improvement and proper use of Cast Iron Pipe. Pipe bearing the Association "Q"-check trade mark may be obtained from any of the following:

Bell and spigot cast iron pipe embodies the three indispensable features of a perfect pipe joint—provision for expansion, contraction and deflection.

Alabama Pipe Company, Anniston, Ala.; American Cast Iron Pipe Company, Birmingham, Ala.; James B. Clow & Sons, 219 N. Talman Avenue, Chicago, Ill.; Donaldson Iron Company, Emaus, Pa.; Glamorgan Pipe and Foundry Company, Lynchburg, Va.; Lynchburg Foundry Company, Lynchburg, Va.; National Cast Iron Pipe Company, Birmingham, Ala.; United States Pipe and Foundry Company, Burlington, N. J.; Warren Foundry and Pipe Company, 11 Broadway, New York.

Actual photograph of the first 24-inch Mono-Cast pipe, centrifugally cast at Birmingham, Alabama, July 19, 1929. This pipe is now being made in 16-foot lengths.

AMERICAN Cast Iron Pipe Company is now receiving orders for the new large-diameter "Mono-Cast" centrifugal cast iron pipe. Sizes: 14", 16", 18", 20", and 24". Length: 16 feet. Type: bell-and-spigot, with the bead *cast on* the spigot end . This new large-diameter pipe combines the well-known convenience and economies of smaller "Mono-Cast" in a pipe of diameter sufficient to take care of greatly increased service demands for decades to come. It should be carefully considered by municipal authorities, city engineers, public works contractors, and all other responsible for the expenditure of taxpayers' money.

Deliveries will be made early in the year. For full details write "Acipco" office nearest you.

AMERICAN

CAST IRON PIPE COMPANY

BIRMINGHAM, ALABAMA

Branches: New York City, Chicago, Kansas City, Minneapolis, Detroit, Dallas, Los Angeles, San Francisco, Seattle, Cleveland.

311W

MONO-CAST

CENTRIFUGALLY CAST ALL IN ONE PIECE . . . INCLUDING THE BEAD ON THE SPIGOT END

ELIMINATING HEALTH'S HAZARDS

The drinking fountain is the common meeting place.. Therefore it is humanly economical to install the Rundle-Spence . . . the fountain with unusual sanitary advantages.

The R-S Vertico-Slant fountain design makes it impossible for the user to touch his or her lips to the nozzle. Water spouts slantingly from jet to mouth, the excess falling into the bowl and not on the jet. Only the R-S fountains have Vertico-Slant health guarding features.

R-S water fountains come in white, green, blue or any color you choose. Write for our catalog.

RUNDLE-SPENCE MFG. CO.

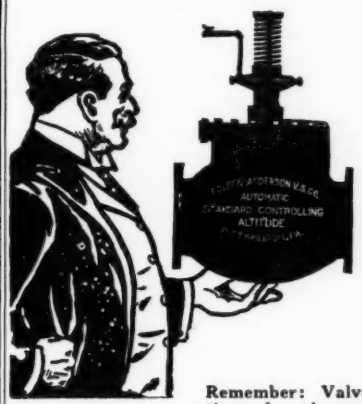
446 No. Fourth Street Milwaukee, Wisconsin

RUNDLE-SPENCE

LIPS CAN NOT TOUCH THE R-S NOZZLE

WATER CONTROL

without floats or fixtures



A constant water level can be automatically maintained in reservoirs, tanks and standpipes by the use of

GOLDEN-ANDERSON Automatic Cushioned Controlling Altitude Valves

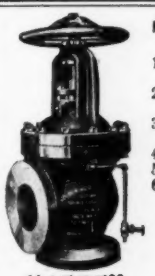
These valves are always cushioned in closing and opening. They are extensively used for automatically maintaining a uniform stage of water in reservoirs, tanks and standpipes. No valves inside No floats or fixtures, inside or outside of tanks. No freezing troubles. Three ways of closing these valves:

1st—Automatically, by water
2nd—By electricity, if desired
3rd—By hand

Remember: Valves cushioned at all times by air and water. No water hammer or bursting mains.

"Made with stop starter attachment for centrifugal pumps."

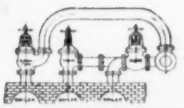
Golden-Anderson Valve Specialty Co.
1329 Fulton Bldg., Pittsburgh, Pa.



"4575"
Used by Steel Cos.

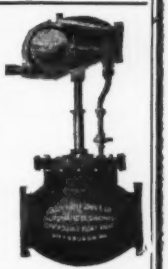
Pat. Automatic Double Cushioned Triple Acting Non-Return Valves

1. Prevent shut-downs due to reversa of steam flow.
2. Instantly close and isolate a boiler when a tube bursts.
3. Cut off steam flow from every boiler instantly when a steam pipe ruptures.
4. Automatically cut a boiler into line.
5. Prevent backflow into cold boiler.
6. The only valves that can be tested in service.



Angle, Globe or Elbow

Patent Automatic Cushioned Controlling Float Valves



They carry a constant water level in feed water heaters by perfectly controlling the flow of makeup water.

Operated by protected enclosed copper float.

Cushioned by both air and water.

Operate without hammering, sticking or chattering. No metal-to-metal seats. Made angle or straightway.

Sizes 1 in. to 24 in.

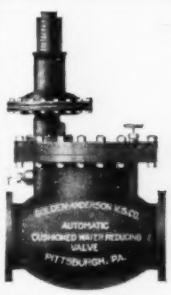
Pat. Automatic Double Cushioned Check Valves

1. Especially adapted for water service.
2. For high or low pressure.
3. Thoroughly cushioned. No chattering, hammering, or sticking.
4. Globe or angle patterns up to 30 inches.
5. Especially adapted for hydraulic elevator service.

Pat. Automatic Cushioned Water Float Valves

1. Automatically maintain uniform water levels in tanks, standpipe, etc.
2. Instantly adjusted to operate quickly or slowly
3. Floats swivel to any angle—most satisfactory float valves known.
4. No metal to metal seats—no water hammer or shock.
5. Cushioned by air and water.

Sizes ½ to 24 in.



Pat. Automatic Cushioned Water Pressure Regulating Valves

1. Maintain a constant reduced pressure regardless of fluctuations on high pressure side.
2. Perfectly cushioned by water and air. No metal-to-metal seats.
3. The best valve made for maintaining a constant low pressure where consumption is continuous.
4. Operates quickly or slowly as required—No attention necessary.
5. Positively no hammering or sticking. Sizes to 24 inches.

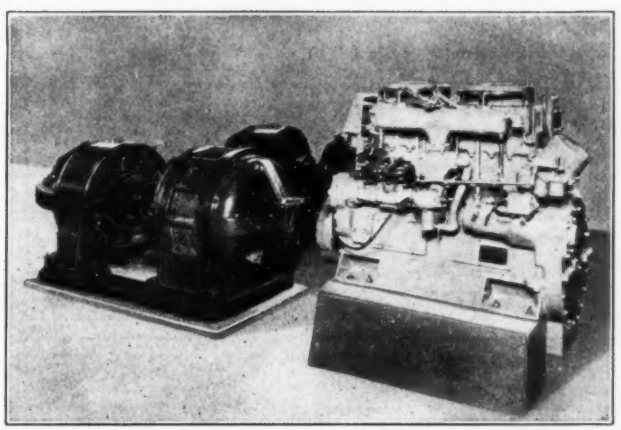
CITIES, COAL MINES and CEMENT PLANTS

are numbered among the 1000 installations of

Sterling High Duty Internal Combustion Engines

12 to 565 B. H. P. Gas or Gasoline

Whenever standby power is quickly needed in an emergency, it is important enough to employ a STERLING



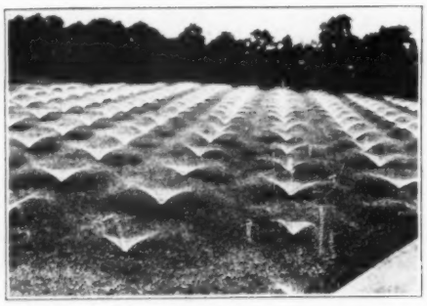
Volunteer Portland Cement Co., Knoxville, Tenn. 1200 R.P.M., G.E. synchronous motor generator set, driven by a direct connected 120 HP. Sterling engine. Assures power at all times for kilns.

STERLING ENGINE COMPANY

1270 Niagara St., BUFFALO, N. Y. Dept. C11 900 Chrysler Bldg., NEW YORK, N. Y.

MILLER
FLUSH-TANK SIPHONS

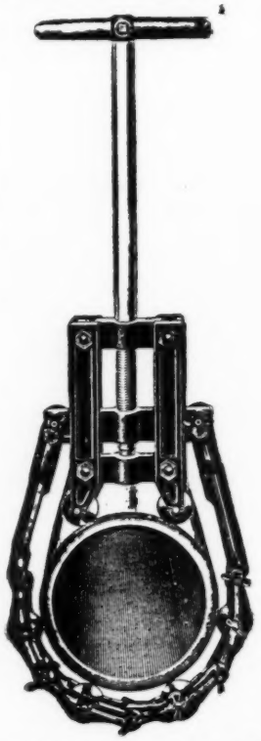
SEWAGE-DISPOSAL APPARATUS
for
Sprinkler Systems, and Sand Beds



Downes Floating Covers
(Patented)
For
Separate Sludge-Digestion Tanks

For Catalogs Write to
PACIFIC FLUSH-TANK CO.
4241 Ravenswood Ave. — Chicago, Ill.
9 Park Place — New York

ONE CUT SAVES THE PRICE



YOU, too, may save the cost of this pipe cutter on one job, just as many other contractors and water companies have done.

The ELLIS PIPE CUTTER

with its six keen rotary cutting blades eats its way right through any pipe in double-quick time. Use No. 01 for all kinds of pipe 4 to 8 inches in diameter, or No. 1 for pipe 4 to 12 inches in diameter.

Write for circular

ELLIS & FORD MFG. CO.
38 Piquette Ave. — DETROIT, MICH.

SLUDGE BED
Glass Overs

Lord & Burnham Co.
IRVINGTON, N. Y.

Paradon
CHLORINATORS
for City and Private Water and Sewage Systems, Industrial Plants and Swimming Pools.

Over 1,400 PARADON Chlorinators are in operation on every conceivable type of water supply, swimming pool and sewage plant.

Send for Bulletin M-21

PARADON MFG. CO.
Arlington -- New Jersey

TROUBLE - PROOF
DO NOT GIVE TROUBLE. DO NOT FREEZE.
Complete Line Anti-Freezing Drinking Fountains, Hydrants and Street Washers shown in Catalog 107.
THE MURDOCK MFG. & SUPPLY COMPANY
In Business Since 1853 — Cincinnati, Ohio

Roberts Filters

Over a billion gallons of water are now filtered daily by Roberts Filters on municipal water supply systems alone. Hundreds of industrial installations deliver almost an equal amount. Our list of recirculation plant installations includes the most modern outdoor and indoor swimming pools in the country. Write us for information.

ROBERTS FILTER MANUFACTURING CO.
602 Columbia Ave. — Darby, Pa.

PURE WATER

TURN *YOUR* BACK ON RUST TOO...

When McWane 1¼, 2, or 3-inch cast iron pipe goes in, the chance for future trouble with rust goes out.

Every water works man knows that cast iron pipe cannot rust. But many of them overlook the fact that they can now use McWane Cast Iron Pipe for every size above 1 inch.

Cast Iron Now Costs Less

The new long laying-lengths in which McWane Cast Iron Pipe in small sizes now comes, are shown above. They make laying McWane small pipe as fast as laying any other pipe.

Nor are skilled pipe-fitters required to handle it. The cost per year of cast iron is lower than for perishable pipe—because you only lay it once. First cost is last cost.

Get new McWane Small Cast Iron Pipe booklet *today*.

Larger Sizes Too

McWane Cast Iron Pipe comes as large as 12 inches B. & S. Type. With or without precalked joints. Standard lengths, and SAND CAST. Write or wire for prices.

McWANE CAST IRON PIPE CO. BIRMINGHAM ALABAMA

PACIFIC STATES CAST IRON PIPE CO. PROVO, UTAH

CHICAGO: 208 So. La Salle St.
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PORTLAND ORE.: 611 Spalding Bldg.
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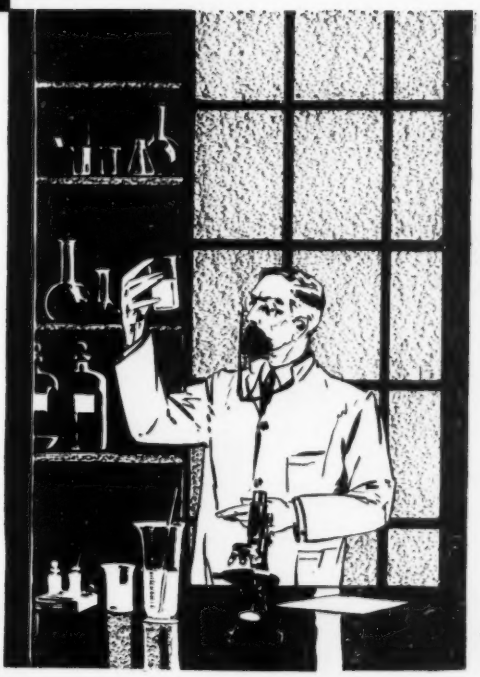
DENVER: 226 Continental Oil Bldg.

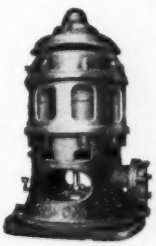
Purer Pumped Water an obligation



SHALL HEALTH SUFFER AND DOCTORS PLEAD IN VAIN?

PURER PUMPED WATER is an obligation which confronts most municipalities. Public opinion is becoming conscious of the necessity for purer uncontaminated water procured from an unquestionable source.

River or drainage water at its best, cannot meet the high standards of purity set by health authorities. Water pumped from DEEP WELLS with Pomona Pumps is insurance against surface contamination, freedom from water shortage, and a constant protection against excessive lifting costs. Pomona Pumps give highest efficiency over wide range and eliminate oil and grease lubrication below the surface.



Distributors, Factory Representatives and Service Facilities in all principal cities. Name of nearest one and Bulletin on request.

POMONA PUMP CO.
Pomona, Calif.

POMONA

Oceans of Water

WATER-LUBRICATED TURBINE **PUMPS**

Six hasn't the wisdom of sixty.....

IN keeping away from the dangers of motor-infested streets school children cannot be expected to exhibit the wisdom of their elders, for to the child mind danger signs mean but little and warnings are soon forgotten.

A fence conveys its own commands and compels their obedience. Only with a fence can you *enforce* safety Only with a fence can little feet be kept on the playground.

Anchor Playground Fences are substantial, durable and attractive. Their points of superiority will be explained by Anchor representatives who are located in principal cities. Consult your telephone book or write for complete Catalog.

ANCHOR POST FENCE COMPANY
Eastern Avenue and Kane Street, Baltimore, Md.

Albany, N.Y., Boston, Charlotte, N.C., Chicago, Cleveland, Detroit, Hartford, Houston, Indianapolis, Los Angeles, Mineola, N.Y., Newark, New York, Philadelphia, Pittsburgh, San Francisco, St. Louis, Shreveport
Sales Agents in other principal cities. Consult your 'phone directory.

ANCHOR *Fences*

"MADE BY THE MAKERS OF AMERICA'S FIRST CHAIN LINK FENCE"

FIRE HOSE SPECIALISTS

—doing one thing and *doing it well*

If you have had experience with our Wax and Para Gum Treated Fabric, Rubber Lined Fire Hose, we need no better testimonial than its record in your service.

If you have not used it, why not try it and be convinced?

FABRIC FIRE HOSE COMPANY
9-15 Park Place
NEW YORK

FACTORY: SANDY HOOK, CONN.
Patentees and Sole Manufacturers since 1880
WAX AND PARA GUM TREATED COTTON RUBBER LINED FIRE HOSE

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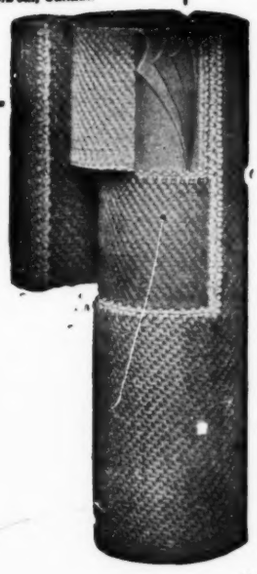
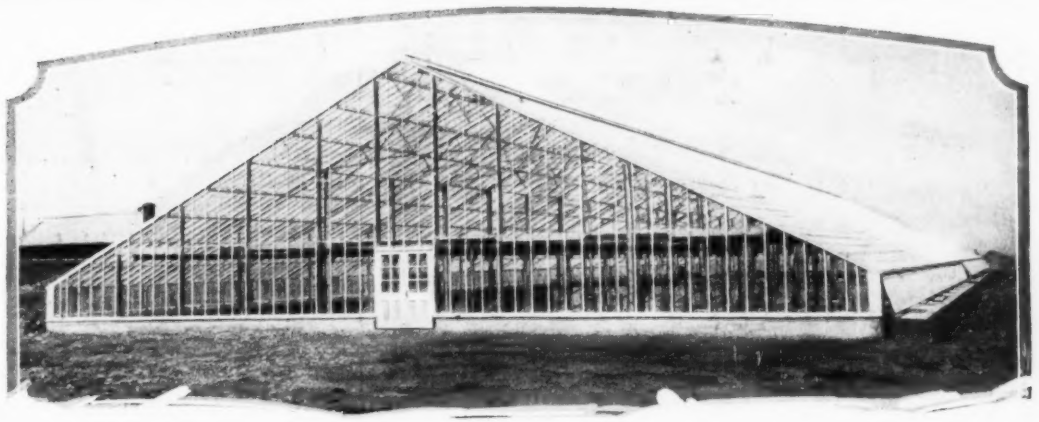


Ten good reasons for using glass sludge bed covers:

1. Allows perfect control of dryings
2. Permits winter and rainy weather dryings
3. Increases the number of dryings three to four times
4. Greatly reduces odors
5. Reduces fly and insect nuisance
6. Prevents mosquitoes breeding in sludge pools
7. Economizes by reducing space required
8. Cost per capita not increased
9. Hides unsightly sludge beds
10. Reduces depreciation of adjoining property

Building Better Greenhouses Since 1869



American-Moninger Sludge Bed Covers again chosen

AT the new sludge bed plant of the City of Dunkirk, New York, two American-Moninger glass sludge bed covers, one 75 x 125 feet and one 74 x 250 feet, were erected.

American-Moningers were chosen for this plant because these glass sludge bed covers are all the steel frame type of acid- and fume-resisting construction and built without interior costs. The roof is supported by steel trusses, built according to the approved engineering practice and standards. This construction is amply strong to withstand the snow loads in winter.

With ample facilities for designing and building all kinds of glass sludge bed and sprinkling filter covers, American-Moninger Engineers will gladly furnish preliminary plans and estimates without obligation on your part. Talk with an American-Moninger official before you build.

AMERICAN-MONINGER GREENHOUSE MFG. CORP.

General Offices: 1941 Flushing Avenue, Brooklyn, New York

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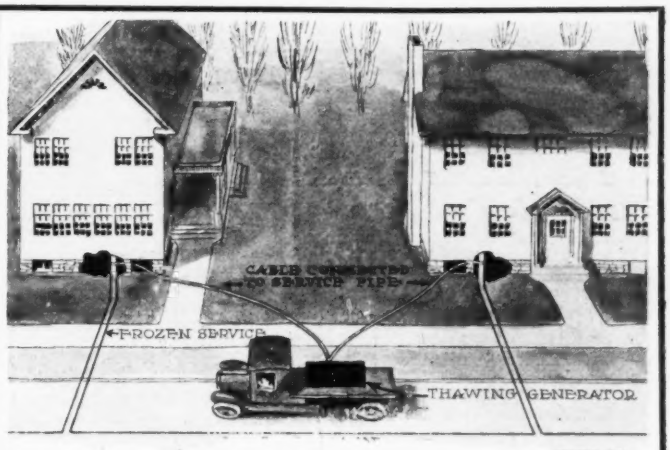
THE ENGESSER PIPE THAWING SET

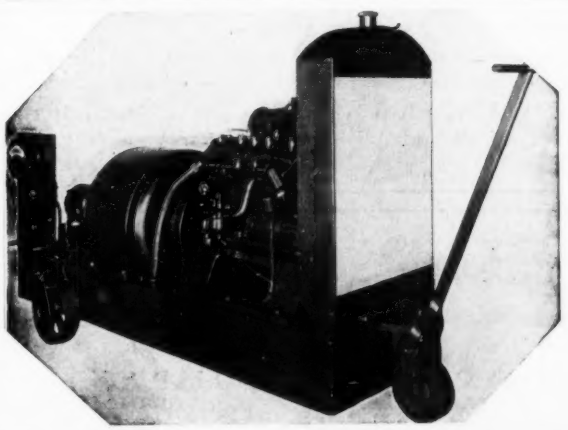
Note the simple method of connecting it to the frozen service pipe, as shown in the diagram at the right: . . . . . .

Two men can easily operate it, thawing out a 300-foot ¾-inch service pipe in from 3 to 10 minutes; or a 100-foot 3-inch pipe in from one-half to one hour.

Simply mount it on any one-ton truck. It generates its own power.

SENT ON 30 DAYS' TRIAL





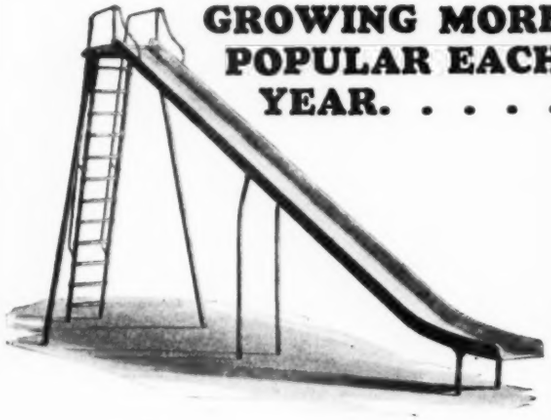
Write for further details of this simple, quick-acting, inexpensive, self-contained pipe-thawing set to

ENGESSER

ELECTRIC MFG. CO., INC.

WATERTOWN NEW YORK

You can't stop pipes from freezing, but you can stop expensive pipe-thawing methods



GROWING MORE POPULAR EACH YEAR. . . . .

The sales of American Playground Devices were greater during 1930 than in any other previous year . . . . the reason is . . . . the users of devices for playgrounds appreciate the two hobbies foremost in the American policy. These hobbiees are Prompt Shipments and Highest Quality Matereials.

If you are interested in purchasing play equipment that has no superior; and if complete shipments within twenty-four hours after receipt of orders desired, then you should place your next order with us.

AMERICAN PLAYGROUND DEVICE CO.

ANDERSON, INDIANA, U. S. A.

CALABAR BASS FIBRE

for

ROTARY SWEEPING MACHINES

OR

PUSH BROOMS

Any Quantity—Any Length

Proven by all tests the most satisfactory broom filler

Also any other grades African Bass Fibre

Samples and Prices on request

E. B. & A. C. WHITING CO.

Importers—Manufacturers

Burlington, Vermont

It will pay you to get an estimate from Stewart on Iron Fencing, Gateways and Chain Link Wire Fences.

The Stewart Fence Specialist will help you with fence problems. Send for catalog and his address.

See Stewart pages in The Municipal Index

THE STEWART IRON WORKS CO., Inc.
702 Stewart Block Cincinnati, Ohio

EVERWEAR

Playground and Water Apparatus

The recognized standard of safe and permanent equipment value for the playground and swimming place.

Write for the new 1930 Catalog No. 22

The Everwear Mfg. Co.
Desk 12
Springfield, Ohio

Do You Want Prices or Anything?

Readers of THE AMERICAN CITY desiring to secure catalog or price lists on any sort of machinery equipment or supplies for municipal or county work are invited to state their wishes to the Catalog and Price List Department, The American City, 470 Fourth Ave., New York. One letter to us will secure you the information you desire free of all charge, and at a considerable saving of time and correspondence.

LAY

Lay Split Hickory Fiber

for street cleaning brooms is made by special-built machinery which insures a higher grade product. A trial will convince you. Write us for prices.

THE LAY MANUFACTURING COMPANY

DALLAS J. G. Carrier, *Manager* NORTH CAROLINA

Stop! At Booth A-72 *at the* Road Show

We want to greet old friends and make new ones at the road show. Let us tell you why the world's largest motor car manufacturer uses Cyclone Road Guard on its proving grounds. Let us tell you why highway engineers and authorities everywhere specify Cyclone Road Guard.

Cyclone ROAD-GUARD
REG. U.S. PAT. OFF

Safe roads demand proven road guard for curves and embankments. Cyclone Road Guard is made of strong chain link fabric, heavily galvanized. Extremely durable, it lasts for years. Easily and quickly installed. If you can't get to the road show, write us for specifications and full information.

CYCLONE FENCE COMPANY, *General Offices,* Waukegan, Ill.
Branch Offices in All Principal Cities
Pacific Coast Division: STANDARD FENCE COMPANY, Oakland, Calif.

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SUBSIDIARY OF UNITED STATES STEEL CORPORATION

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TOKHEIM

2 Features of the Tokheim CHRONOPLAN System of Traffic Control

—Moves traffic efficiently!

The control and movement of traffic is efficient only when the minimum amount of time is utilized in stopping and starting a group of cars. The CHRONOPLAN System obtains this objective in individually compensating blocks of unequal length and intersections subject to varying amounts of cross-traffic.

—Continuously!

With the time cycle set up to permit traffic to move at a certain safe speed per hour, the Tokheim CHRONOPLAN System moves traffic continuously. It naturally follows that the main artery under control, becomes a veritable "through" street, on which a group of cars, or groups of cars, seldom need stop.

—Ask for a copy of Bulletin No. 2000, an interesting discussion of efficient traffic control.

TOKHEIM OIL TANK & PUMP CO.
Fort Wayne, Indiana

CHRONOPLAN

REPRESENTATIVES WANTED!!

Lyle Signs, Inc., for 17 years, makers of the famous

LYLE Carved-In SIGNS

have a few choice territories now available for responsible men.

In addition to the LYLE Carved-In Street Signs (made by exclusive, patented machines) the Lyle Line also includes—

Parking Signs	Stop Signs
Traffic Paint	Semaphores (Manual)
Danger Signals	Oval Signs
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Complete details of the possibilities such an affiliation will afford you may be had by addressing

LYLE SIGNS, INC.
MINNEAPOLIS MINNESOTA

BRASS

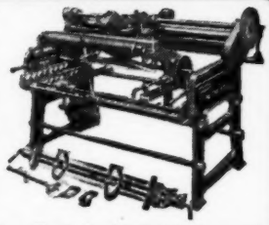
the metal that is immune to climatic conditions, is used in our Street Signs, which are constructed along practical, scientific and engineering lines, making a permanent street sign with minimum installation costs.

Write for catalog

UNION IRON PRODUCTS CO.
Drawer H East Chicago, Ind.

THE PEERLESS MOWER SHARPENER

THE Peerless Mower Sharpener is a wonderful but simple invention that sharpens all makes of power and hand lawnmowers, scientifically, quickly, perfectly; does the work as nothing else can. Grinds a perfect bevel and clearance—no more pulling and tearing of turf. Operated by 1-3-hp. motor—attach to your lamp socket. Skate Sharpener Attachment sharpens all makes of skates. Earns money all the year round. Will save its cost the first season. Write for Catalog and list of users.



The Fate-Root-Heath Co.
908 BELL STREET
PLYMOUTH, OHIO

Hundreds of Golf Clubs, large and small, now use the Peerless Mower Sharpener.

WHERE AM I, MISTER?

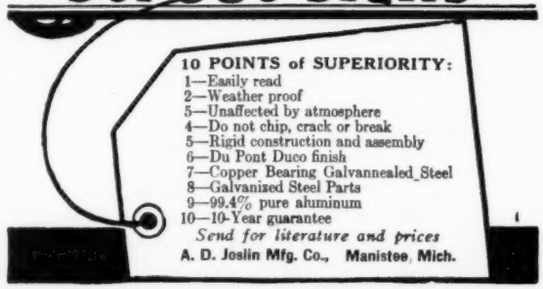
How often is that question asked in YOUR city, not only by strangers in town, but by your own citizens living in other sections? And all because your streets are not properly marked!

Our latest development in street signs will allow you to erect them on every corner. Write for particulars.

A four-way porcelain enamel sign, in aluminum holder, ready to mount on 2-in. post, complete, in reasonable quantities..... 6.50

ROCHESTER STREET SIGNAL CO.
400 Ward Bldg. Rochester, N. Y.

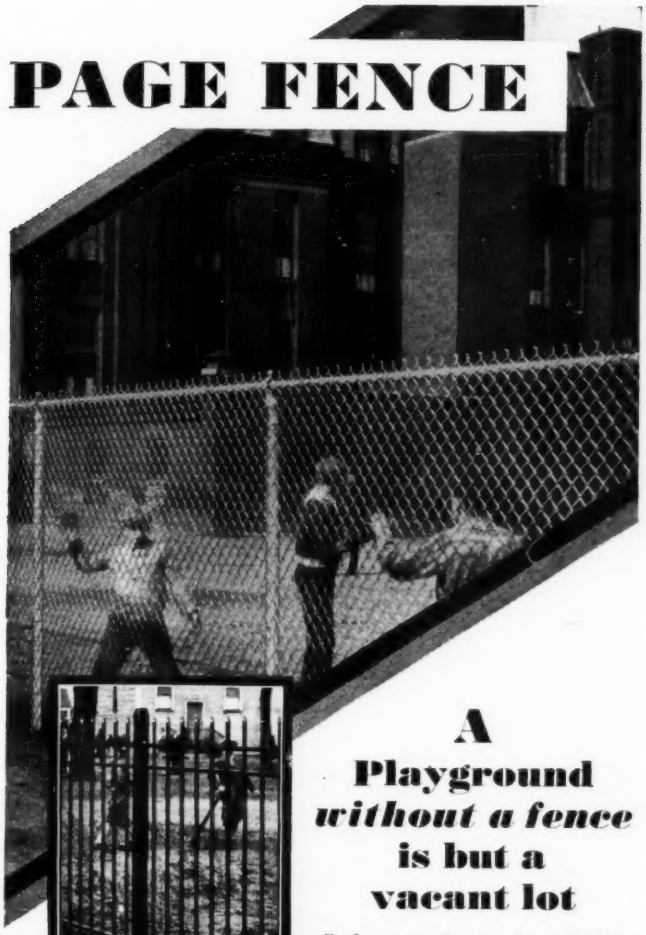
JOSLIN Street Signs



10 POINTS of SUPERIORITY:
1—Easily read
2—Weather proof
3—Unaffected by atmosphere
4—Do not chip, crack or break
5—Rigid construction and assembly
6—Du Pont Duco finish
7—Copper Bearing Galvannealed Steel
8—Galvanized Steel Parts
9—99.4% pure aluminum
10—10-Year guarantee

Send for literature and prices
A. D. Joslin Mfg. Co., Manistee, Mich.

PAGE FENCE



A Playground *without a fence* is but a vacant lot

Safety—safety—the children are safe—shielded, sheltered, fenced in. Your mind won't picture a playground without a fence or a schoolyard or that portion of public parks set aside for the little folks.

And what punishment that fence must stand! Is it any wonder PAGE has spent a half-century developing fence durability!

PAGE specializes in Park, Playground and School fencing in four fine metals to combat differing local atmospheric conditions—

1. **PAGE ALCOA ALUMINUM**
2. **PAGE ARMCO INGOT IRON**
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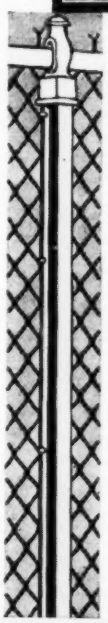
4. **PAGE ORNAMENTAL WROUGHT IRON**

76 Service Plants erect PAGE Fence everywhere. Write for name and address of Plant in your locality. They will gladly consult with you and offer suggestions from plans to final erection. No obligation whatever. Complete descriptive literature on request. Address Page Fence Association, 520 North Michigan Avenue, Dept. E33, Chicago, Illinois.



PAGE H-Beam Line Posts of hot galvanized high carbon steel offer distinct advantages, but tubular posts are furnished where preferred.

America's first wire fence – since 1883

PAGE STEEL AND WIRE QUALITY PRODUCTS

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nation-wide service through 76 service plants

FENCE

ARMCO

Fence of Armco Ingot Iron fabric is exclusive with Page

Page Fence is a Product of The Page Steel & Wire Co., an Associate Company of American Chain Co., Inc.

ACCO

CHAIN LINK OR ORNAMENTAL WROUGHT IRON

Announcement!

We are pleased to announce the licensing of the Johnson Motor Company of Waukegan, Illinois, for the manufacture and sale of the Rawls Motor Scythe. This well-known tool has been entirely re-engineered and re-designed and will hereafter be known as the Johnson Motor Scythe.

Among the new features are: Spring-floated handles eliminating vibration, boiler-plate side-frame members, belt tightener, Chrome-Nickel-steel pitman rod and sickle-head drop-forged and heat-treated and other advanced features.

The facilities of the Johnson Motor Company to produce a thoroughly satisfactory tool are too well known to require further comment.

We cordially invite all our friends in the trade to book their orders with Johnson Motor Company early as indications are the advance sales will exceed the production schedule.

See this tool at Booth A-123 American Road Builders' Association's Convention, St. Louis, Missouri, January 12th to 16th, inclusive, 1931.

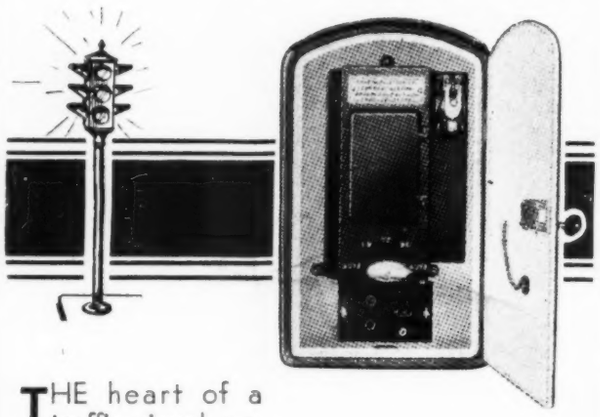
Rawls Manufacturing Company will continue to manufacture its well-known line of Highway and Railway Heavy-Duty Mowers, exhibited at Road Show in booth with Motor Scythe.

RAWLS MANUFACTURING CO.

Cable Address: Rawlsmachy, Streator, Illinois. — Codes ABC 5th Edition and Private

STREATOR ILLINOIS

CO-ORDIPLEX CONTROL



THE heart of a traffic signal system is in the controller, whether the installation is a single, simple intersection or extensive and complicated.

Traffic conditions change rapidly. The flow of traffic does not always remain uniform. A detour, a parade, the opening of a new business block, a new theatre, or even a new residential section will cause either a slight or complete change in the traffic flow on given streets. If you have purchased wisely, your traffic signal controllers will not have to be discarded or re-located when this occurs—select **Eagle Co-ordiplex Traffic Signal Controllers.**

Extremely flexible, quiet and carefree service is provided by the **Eagle Co-ordiplex Controllers.** With them, you can easily make even radical changes in timing to accommodate the varying traffic conditions that are frequently encountered.

Individual outlying intersections can be efficiently handled by the **Eagle Co-ordiplex Controller,** and at any time in the future it can be connected to a flexible, progressive, co-ordinated system, without discarding any equipment.

Descriptive literature awaits your request.

EAGLE SIGNAL SALES CORPORATION

MOLINE, ILLINOIS

(A Subsidiary of The Gamewell Company)

Daily Dependable Duty

Indians are delivering millions of miles of service annually to police forces all over the country.

Millions of miles of dependability—the daily duty of patrolling congested traffic as well as isolated areas.

Rain or shine—heat or cold—on casual "rounds" or in hot pursuit* an Indian is always dependable. It has the power, the speed and the ease of handling so necessary to the officer.

Indians' dependability and stamina is proved by maintenance costs. Massachusetts State Police ran a fleet of 176 Indians a million and a half miles at an average cost of 1¾c a mile for gas, oil, tires and repairs.

* If you *must* use your gun, the *left hand* throttle (exclusive as standard equipment on Indians) leaves your right hand free for accurate shooting.

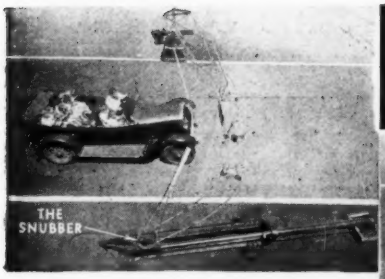
Indian MOTOCYCLES

INDIAN MOTOCYCLE CO.

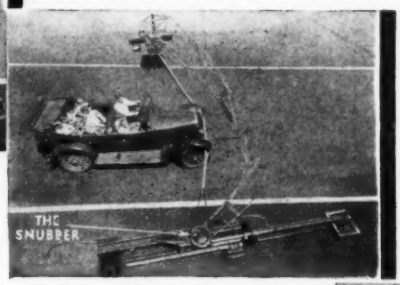
SPRINGFIELD, MASSACHUSETTS

A Modern Grade Crossing Protector for the Modern Highway

THE CROSSING GATE THE MOTORIST CANNOT CRASH

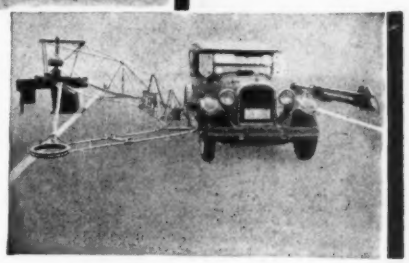


At the moment of contact with the barrier, the wire rope gives an even bearing against the car. The snubber has not started to act.



Compare the position of the snubber in this picture with its position in the illustration above. Here the snubber has moved to take up the shock.

If a lowering barrier comes in contact with the roof of a car it causes no damage. A pressure of 5 pounds stops its motion instantly.



Caught between lowered barriers, a vehicle can push a barrier out of the way and drive to safety. The barrier then closes and locks over the snubber.

ORDINARY crossing gates and roadside signals are no longer capable of providing the necessary safety to the 27,000,000 motorists traveling our highways.

Such old methods are inadequate. They were built for an age that is past. Motorists continue to crash through old-fashioned wooden gates, and ride by signals. The toll in fatalities and damaged property continues to increase at an alarming rate.

No adequate means of protecting crossings, at a cost within reason, was available until THE HIGHWAY GUARDIAN was developed. Now, with this new safety barrier, traffic is stopped by force when necessary. It saves the motorist from his own rashness and carelessness. It puts a stop to fatal accidents, prevents car wrecks and eliminates train delays.

When considering highway improvements, make grade crossings as modern as the new roads you construct. Install THE HIGHWAY GUARDIAN. It costs but a fraction of the expense involved in grade separation. It makes thorough protection of a greater number of crossings possible without increasing expenditures.

Write for complete details of THE HIGHWAY GUARDIAN'S construction and operation.

◆

The fundamental idea from which THE HIGHWAY GUARDIAN has been developed was the ingenious conception of Mr. Joseph B. Strauss, eminent consulting engineer and builder of many of the world's famous bridges.

◆

FRANKLIN RAILWAY SUPPLY COMPANY, Inc.

NEW YORK CHICAGO
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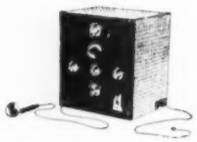
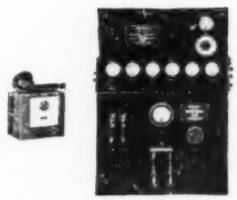
POLICE RADIO

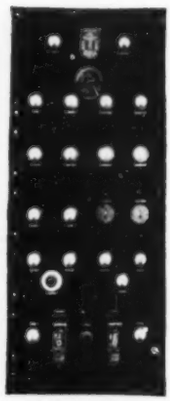
A SIZE AND TYPE FOR EVERY COMMUNITY



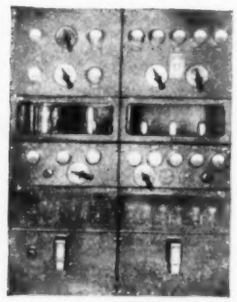
VILLAGE OR SMALL CITY COVERAGE



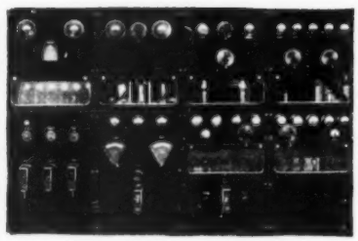
SMALL CITY OR SMALL TOWNSHIP COVERAGE



AVERAGE INDUSTRIAL CITY COVERAGE



METROPOLITAN CITY AND AVERAGE COUNTY COVERAGE



STATE-WIDE COVERAGE

LET US FIGURE OUT A COMPLETE SYSTEM FOR YOU. NO OBLIGATION

DEFOREST RADIO COMPANY
PASSAIC, NEW JERSEY

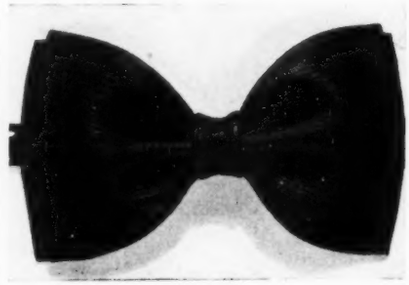
SLIPPERY STREETS!

Fire or police apparatus speeding along slippery streets must give traffic ample time to turn out to safety. A powerful warning blast from the Federal Coaster Siren is heard for blocks ahead, even by drivers of closed cars. There is sufficient time for traffic to clear, even on slippery streets.

Just two-seconds-contact-a-block on the push-button switch causes the Federal Coaster Siren to sound a continuous roar. Let us send you further details.

FEDERAL ELECTRIC COMPANY
Signal Division
8701 South State Street Chicago, Ill.

At LAST a BOW TIE for UNIFORMS That Will OUTWEAR Any Other TIE MADE!



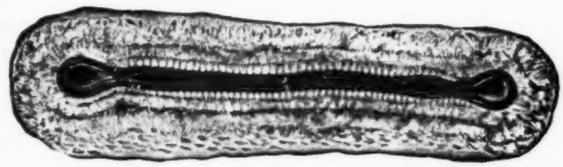
"Once Worn—Always Worn"

Policemen, firemen and postmen all over the U. S. endorse this tie because it:

—holds its shape
—is made of genuine leather
—never cracks or discolors

Write for further information

CENTURY TIE CO.
9377 Woodside
DETROIT, MICH.



BI-LATERAL FIRE HOSE COMPANY
is a modern construction

It will flatten on the apparatus without cracking the rubber lining. It is the one hose that never bursts at fires.

When in the market, let us tell you why.

BI-LATERAL FIRE HOSE
20 NO. WACKER DRIVE CHICAGO, ILL.

HONHORST TAR HEATERS

"Built for service"

ALL STYLES
Portable and Stationary
25 to 200 gallons

See our page in Street Construction Section, Municipal Index, for the Kettle you need.

Write for Pamphlet No. 15 on the New Oil Burning Heater

THE JOS. HONHORST CO.
1016 W. 6TH ST. CINCINNATI, O.

Hotstuf TRADE MARK REG.

MOHAWK HI-SPEED TRAILER TRADE-MARK

SIGNS OF WELCOME

GREETING YOU AS YOU ENTER THE ARENA AT THE

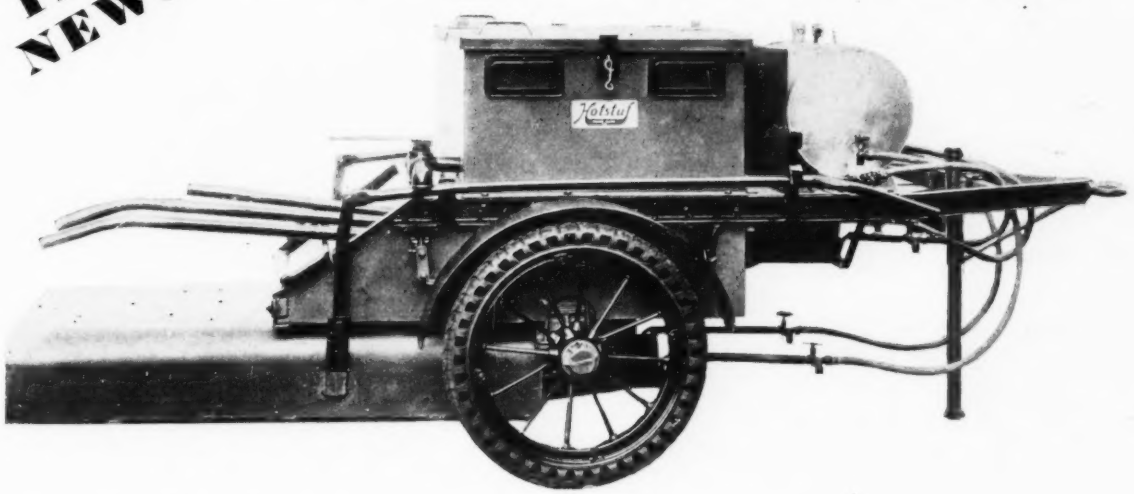
ROAD SHOW

IN

ST. LOUIS JAN. 10 to 16

ANOTHER MOHAWK LEADER
A THREE-IN-ONE COMBINATION

IT'S NEW!



We are also showing our—

HOTSTUF ASPHALT HEATERS
MOHAWK HI-SPEED TOOL TRAILERS
CONCRETE HEATERS, SALAMANDERS
OIL-BURNING TORCH OUTFITS

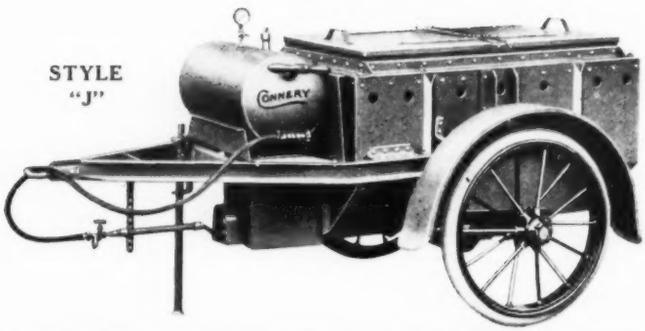
MOHAWK ASPHALT HEATER COMPANY

60 WEAVER STREET SCHENECTADY, N. Y.

CONNERY'S

Oil-Burning Tar and Asphalt Heaters

STYLE "J"



STYLE "J" oil-burning tar and asphalt heating kettle is designed for highway maintenance work and the roofing contractor. Of compact, improved modern design. It is sturdily made to withstand continuous and severe service. Burns kerosene, coal, oil or light furnace oil. Offered in five sizes: 60, 85, 110, 165 and 200 gallons capacities. Rubber-tired wheels (optional equipment)—steel wheels with rollerbearings, standard equipment.

Send for our little "Blue Book" illustrating our many specials in Tar and Asphalt Heaters, Oil-Burning Heaters, Oil Burners, Pouring Pots, Hand Spraying Attachments, Fire Wagons, Tool Heaters, etc.

CONNERY & CO., Inc.
4000 N. Second Street
PHILADELPHIA, PA.

Distributing hot tar on the Turin-Carignano Road, Carignano, Italy

THE TRADE MARK Kinney REG. U.S. PAT. OFF. JUNIOR HEATER AND DISTRIBUTOR

A bituminous Distributor, especially designed for municipal and general requirements, comprising road and street construction and maintenance, calling for the application of bituminous material.

For this service the Kinney Junior Distributor is a modern necessity in both local and foreign fields of road and street service, calling for a small size, light-weight, efficient Distributor equipment.

This Distributor will heat and apply all varieties of bituminous material, hot or cold, in temperature and volume as desired. It is a separate power unit and may be mounted on any light motor truck chassis, including the new Ford models as shown in above cut of Distributor operating in Italy.

The standard tank capacities of the Distributor are 250 and 350 U. S. gallons,—convenient sizes for most efficient service.

Catalog with prices and full details of construction furnished on request.

Manufactured by

KINNEY MANUFACTURING COMPANY
BOSTON, MASSACHUSETTS, U. S. A.

New York
Chicago
Philadelphia

Houston
Kansas City
San Francisco

SAVE TO SPEND

FINANCIAL institutions invite individuals to enroll for Christmas, Travel, Opera and other savings funds to accumulate—through regular saving—the money to SPEND for the purposes indicated by these funds.

You, too, are invited to SAVE to SPEND—on Civic Improvements. You know how seldom the funds are available to finance any but the absolutely essential—however desirable the others may be.

So why not SAVE on some of the *essential* projects to provide funds to SPEND on other contracts—without exceeding the budget—and thus provide the largest number of civic improvements with the available funds.

How to save? Be sure of adequate competition on all contracts. Advertise them in the Proposal Columns of ENGINEERING NEWS-RECORD and reach *all* the bidders who may be interested in your contracts—both local and otherwise.

ENGINEERING NEWS-RECORD has a national circulation of over 32,000 copies per issue among contractors, manufacturers and others interested in civil engineering construction work. Its Proposal Columns are checked every week by these readers for information of public works contracts to be let.

SAVE TO SPEND by advertising future contracts in the most widely circulated — the best known and most dominant proposal advertising medium — ENGINEERING NEWS-RECORD.

If you would like more information about proposal advertising, write for a copy of the Proposal Form drawn up by the Associated General Contractors and ask for data on Engineering News-Record's national proposal advertising service. This material will be gladly supplied without any obligation to you.

Official Proposal Advertising Department

ENGINEERING NEWS-RECORD

A McGraw-Hill Publication—Member A.B.C. & A.B.P.

Tenth Ave. at 36th Street
New York, N. Y.

THREE

THE ELGIN

GREAT

THE AUTO-EDUCTOR

UNITS

THE COLECTO

SANITATION HEADQUARTERS

is now more truly the name than ever

If you wish to clean streets better and faster and save money on bulk or night cleaning that will help buy other equipment or do other work—THE ELGIN.

If you would remove filth from catch-basins or grit-chambers easily, in the most sanitary way and at lower cost—THE AUTO-EDUCTOR.

If you dislike unsightly refuse collection units, if you would move ashes and garbage faster without dust, litter or spilling and for less expense—THE COLECTO.

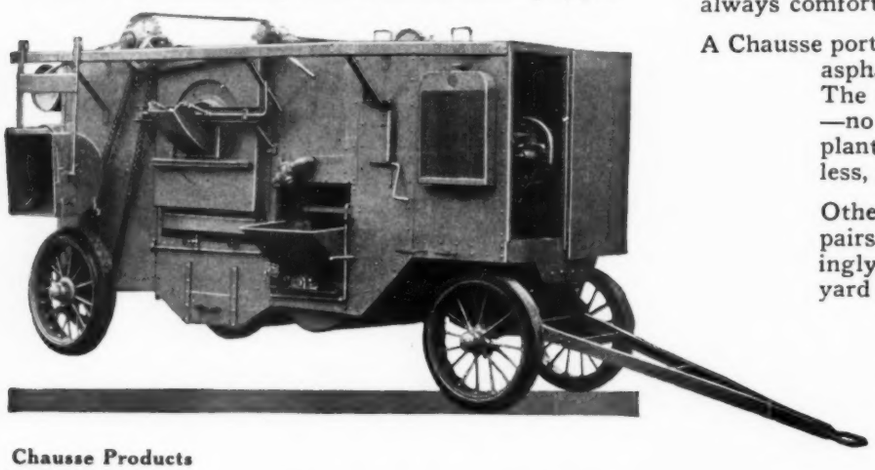
An inquiry about any or all will be welcomed

THE ELGIN CORPORATION

501 Fifth Avenue NEW YORK U. S. A. 100 No. La Salle St. CHICAGO

Asheville Makes Smooth Street Repairs with a Chausse Portable Asphalt Plant

The most modern and economical street repair machine on the market, portable and stationary types.



Patched streets usually mean bumps and unpleasant riding, but streets of Asheville, N. C., are always comfortable and smooth.

A Chausse portable asphalt plant is used to repair asphalt, resurface concrete and brick. The work is done whenever necessary—no need to wait for a contractor's plant to start up. The cost is much less, done by city forces.

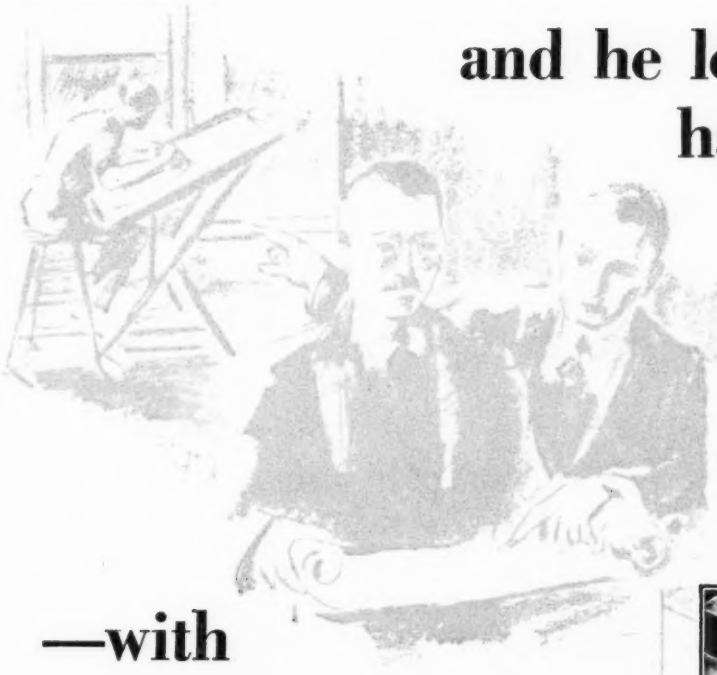
Other cities do all of their street repairs with Chausse plants at surprisingly low expense, less than $1 per yard of 2″ mix, laid.

It will pay every progressive city to investigate. Initial investment is moderate and advantages great in owning your own repair equipment.

Chausse Products
Asphalt Plants
Tar Kettles
Kerosene Torches
Sand Driers
Mixer Heaters

Chausse Oil Burner Company
Elkhart, Indiana

Send for Catalog and Letters from Users

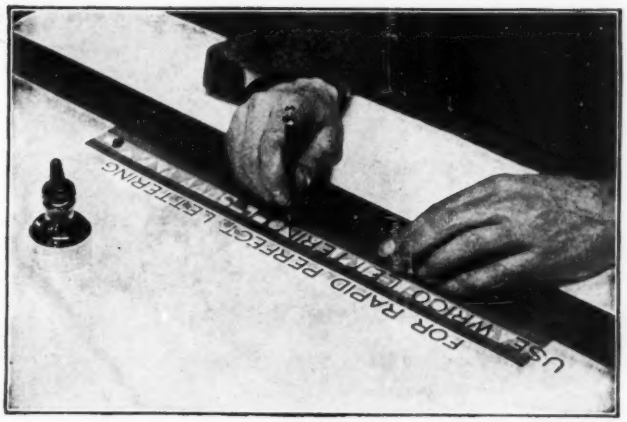


and he lettered it in half the time!"

—with

WRICO

Lettering Guides



By using WRICO Lettering Guides rather than the old "free hand" method, a degree of efficiency and economy is introduced in drafting room work that has not been equaled by the adoption of any other modern drafting instrument.

WRICO Lettering Guides are saving time and improving the appearance of maps and drawings in many thousands of drafting rooms throughout the world. The reason they have been adopted as standard equipment in these drafting rooms is that they enable anyone to do better lettering in less time than can be done in any other way.

The WRICO Catalog

Write TODAY for your copy of the 38 page WRICO Illustrated Catalog containing a complete list of prices and showing samples of all sizes and styles of WRICO lettering.

THE WOOD-REGAN INSTRUMENT CO., Inc.

6 LACKAWANNA PLACE
SOUTH ORANGE NEW JERSEY

CANADA
THE HUGHES-OWENS CO., Ltd.
Montreal Ottawa
Toronto Winnipeg

EXPORT SALES OFFICE
44 Whitehall Street
New York City

LONDON OFFICE
68-72 Windsor House
Victoria St., S. W. 1

AUSTRALIA
J. CREFFIELD PTY., Ltd
171 King Street
Melbourne

CLETRAC

NEW!

????

To be announced at the Road Show

CLETRAC TWENTY

CLETRAC FORTY-THIRTY NEW!

CLETRAC FORTY

CLETRAC EIGHTY-SIXTY

At the

ROAD SHOW

you will find the Cletrac Exhibit in Building "A" in adjoining spaces 24 and 44, January 12 to 16, at St. Louis.

CLE

CRAWL

NEVER before in a single tractor line has there been offered so extensive an array of industrial power units as you find in the 1931 Cletrac line-up. With a power range up to a maximum delivery of 80 h.p. in the big 80-60, the line meets fully every power need in road and general contract work. Up-to-the-minute in every mechanical detail — rugged as tough steels and sound design can make them — dependably powered with the most modern of tractor motors — these Cletracs offer unquestionably the greatest values from which to select your 1931 tractor equipment.

— Automatic lubrication on all models

— Exclusive, patented planetary gear steering

— Remarkably low oil and gas consumption

See the Cletrac full line exhibit at the ROAD SHOW. The new smaller Cletrac with its marked advantages for small horsepower jobs — the new Cletrac "40-30" with its trim lines and superb performance — the Cletrac "20" — the old, trusty "40" — the incomparable "80-60" — all of these will be there to give you at first hand a complete picture of how Cletrac can serve you.

Literature on any or all models will be mailed on request.

The Cleveland Tractor Company

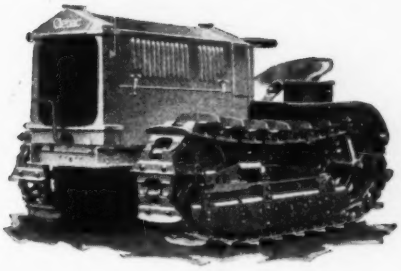
19326 Euclid Avenue Cleveland, Ohio

TRACTOR TRACTORS

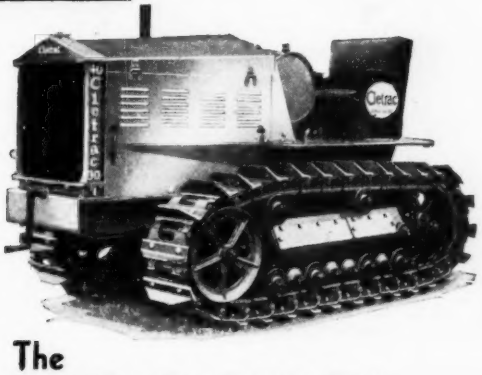
TO BE ANNOUNCED AND EXHIBITED AT THE ROAD SHOW JANUARY 12TH

The ????

NEW!

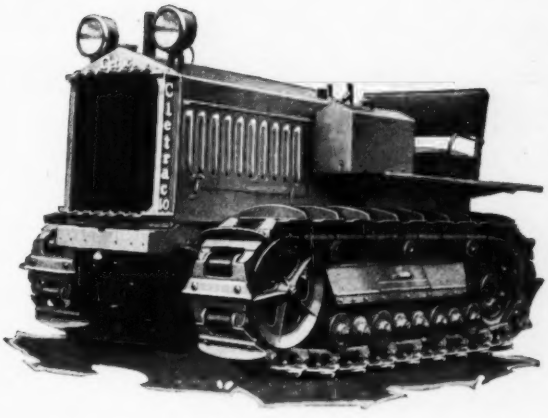


The TWENTY

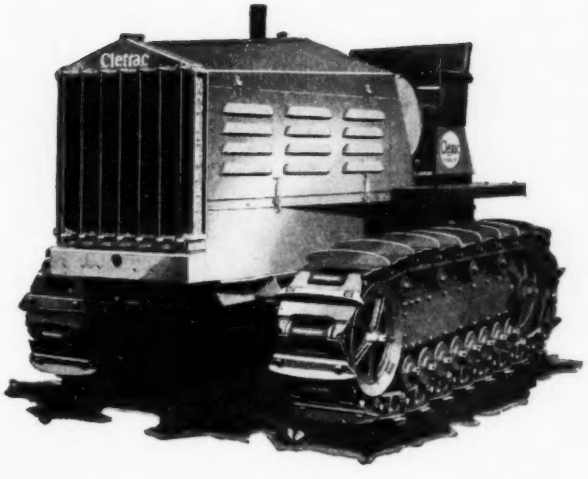


The FORTY-THIRTY

NEW!



The FORTY



The EIGHTY-SIXTY

South Willard Street, Burlington, Vt., paved with Standard Refined Paving Asphalt.

STANDARD ASPHALTS

SOCONY BRAND

Standard Asphalt Binder A
for surface treatment

Standard Asphalt Binder B
for penetration work

Standard Asphalt Binder C
for the mixing method

Standard Asphalt Joint Fillers
for brick or block pavements

Standard Cold Patch Asphalt
for repairing all types of bituminous road surfaces

Standard Refined Asphalt
for sheet asphalt paving

Standard Paving Flux
Bridge Asphalt and
Preserving Oils

SO NY SOCONY ASPHALTS AND ROAD OILS STANDARD OIL CO OF NEW YORK

Specifications and all other particulars furnished upon request

STANDARD OIL COMPANY OF NEW YORK

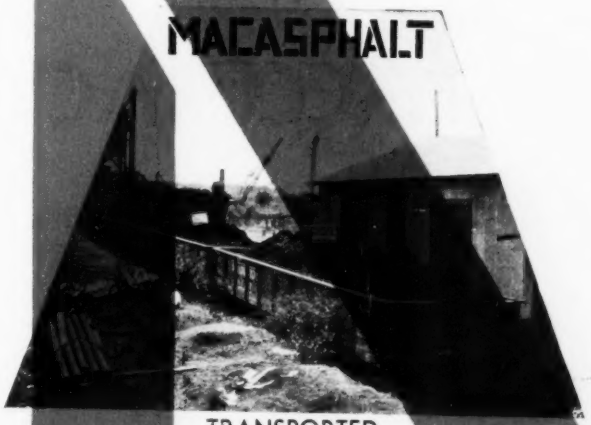
Mention THE AMERICAN CITY—it helps.

MACASPHALT

STANDARD BITUMINOUS PAVING MATERIAL

Trade Mark, Registered U. S. Patent Office

TRANSPORTED-STORED-LAID COLD



TRANSPORTED

STORED

LAID COLD

City, county and state officials welcome this ideal bituminous paving material, which can be transported, laid and rolled at air temperatures during construction, or placed in storage for an indefinite period. MACASPHALT is produced by the mixing of coarse or fine aggregates and fillers, with MACASPHALT Bituminous Cement as binder, and is furnished in shipments of one ton to a train load. It has thoroughly demonstrated its exceptional workability at reasonably low temperatures on a large number of road jobs.

MACASPHALT FOR SURFACING OR RESURFACING PAVEMENTS:

A MACASPHALT pavement can be depended on to present a smooth, even, dense, resilient, durable, abrasive, non-skid surface. It can be laid over any substantial foundation. It is ideally adapted to the resurfacing of old pavements such as concrete, wood block, granite block, brick, asphalt and water-bound macadam. Hardly a city or town in the land but has some streets or roads that could be converted into high-class pavements by the use of MACASPHALT. It is also admirably suited to maintenance work on all types of paving, and will blend with old bituminous paving if, in the particular MACASPHALT mixture used, aggregates were incorporated that are similar to those used in the original pavement. In this way, unsightly patches are eliminated.

MACASPHALT FOR BRIDGE FLOORS AND RAILROAD CROSSINGS:

For bridge floors or railroad crossings MACASPHALT provides a non-skid surface that is so inherently resilient as not to be affected by vibration of the bridge spans or of passing trains. Its positive bonding properties insure against separation of the surface from the ballast and the webs of the rails, while its susceptibility to compaction without any pushing displacement insures smooth and even surfaces.

MACASPHALT FOR AIRPORT RUNWAYS, PAVEMENTS AND HANGAR FLOORS:

On airport developments, where particularly smooth, non-skid and resilient surfaces are desired, MACASPHALT has already proved its value. Wherever it has been used, absolutely no damaging effects from tail-skid action have been experienced.

MACASPHALT FOR TENNIS COURTS AND PLAYGROUNDS:

For the tennis court or basketball court, a sufficiently non-skid surface is obtained by the application of a light layer of MACASPHALT. This does not stain or disfigure the court, and eliminates the necessity of tapes or continual marking of lines. When considering permanency in tennis or basketball court construction, use MACASPHALT.

Write for the MACASPHALT booklet, giving full details.

ACASPHALT CORPORATION OF AMERICA

381 Fourth Avenue, New York City

LICENSEES

MACASPHALT CORPORATION OF FLORIDA
State Bank Building
Lakeland, Florida

MACASPHALT CORPORATION OF GEORGIA
886 Glenwood Avenue, S.E.
Atlanta, Georgia

MACASPHALT CORPORATION OF NEW JERSEY
65 Court Street
Hackensack, New Jersey

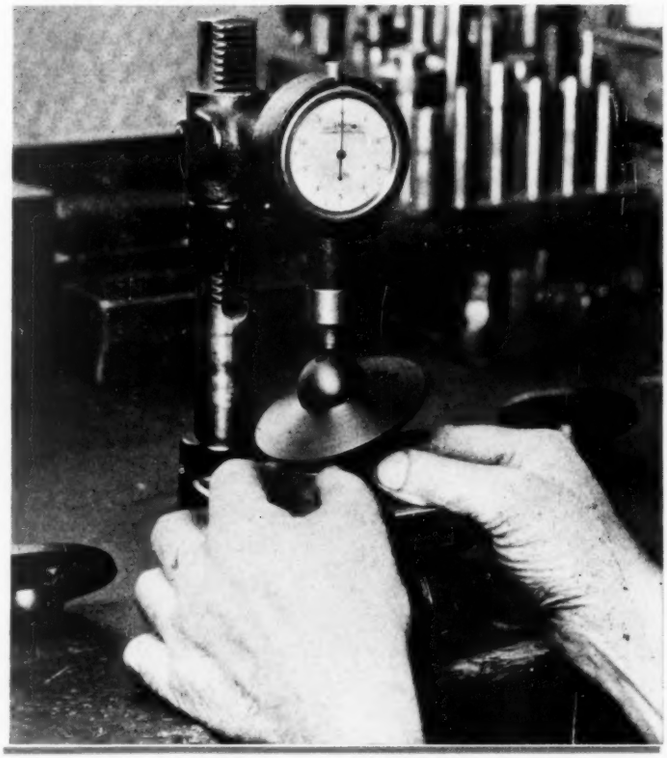
MACASPHALT CORP. OF MASSACHUSETTS
910 Huntington Avenue
Boston, Mass.

MACASPHALT LTD.
2020 Union Avenue
Montreal, Canada

WM. P. McDONALD [illegible] Co.
33-04 Lawrence Street
Flushing, Long Island, N. Y.

HERSEY "PRECISION-MADE" METERS HAVE GREATER ★ ACCURACY

THE discs of Hersey Water Meters, in fact every machined part, must meet rigid tests of measurement. Specially constructed micrometers are used that will detect errors in dimension to the thousandth of an inch! Parts that are too large or too small must be reworked or are thrown out as defective. Such accuracy in construction and fitting of all parts of the Hersey Disc Meter is reflected in the accuracy of registration of these meters. Initial accuracy because of initial painstaking construction lasts over a longer period of years. Readjustments are unnecessary—testing in service is unnecessary. Maintenance is low and greater accuracy returns greater revenue to your department. Write us about Hersey Meters today.



See What Is Back of HERSEY Performance

★ What per cent of *your* domestic meters is in the repair shop at some time during the year? Meters less carefully made than Hersey Disc Meters take their toll in repair expense. Avoid this expense—investigate Hersey Meters.

HERSEY
WATER METERS

HERSEY MANUFACTURING COMPANY—*Main Office and Works:* Corner E and 2nd Streets, South Boston, Mass.

Branch Offices: NEW YORK CITY, 290 Broadway; PORTLAND, ORE., 475 Hoyt Street PHILADELPHIA, PA., 314 Commercial Trust Bldg.; ATLANTA, GA., 510 Haas-Howell Bldg. DALLAS, TEXAS, 402 Praetorian Building.; CHICAGO, ILLINOIS, 10 South LaSalle Street SAN FRANCISCO, CAL., 690 Market Street; LOS ANGELES, CAL., 450 East Third Street

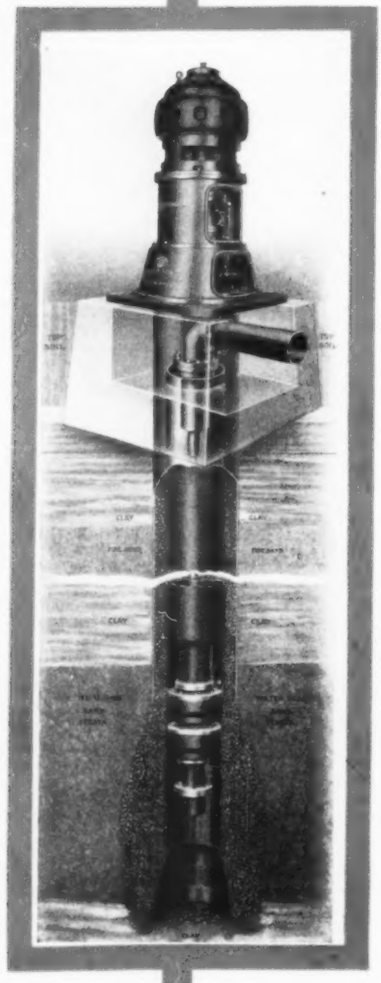
HERCULES ROLLERS

SOLD ONLY THROUGH DISTRIBUTORS

With the presentation at the 1931 St. Louis Road Show of Hercules Models 60, 80, 100 and 120, Hercules offers a complete line of road rollers built to profitably handle any job. Hercules Rollers have won approval. You cannot buy any better—or as good. Don't miss Hercules Booth No. B-51.

THE HERCULES COMPANY - MARION, OHIO.

Specialized engineering *and* Service!



In order to best serve present and prospective users of Layne Water Supply Systems and Layne Pumps, associate companies have been formed and located at most advantageous points. The personnel of these companies is made up of men long schooled within the parent organization.

These men have the necessary technical and practical training. Each group has made an intensive study of its own particular territory so the customer's problems are most economically solved and analyzed.

Each man realizes success depends upon service rendered and is eager and ready to deliver the highest type of service.

Write for name of associate company serving your state

LAYNE & BOWLER, Inc.

Memphis Tennessee

New York	Chicago (Forest Park)	Columbus
Milwaukee	Kansas City	Memphis
Norfolk	South Bend	Lake Charles
Houston	Toronto, Ontario	Moosejaw, Sask.
Paris, France	Torreon, Mexico	Stuttgart, Ark.
Montgomery	Jackson, Miss.	Saigon, Indo-China
Buenos Aires	Los Angeles	Rio de Janeiro

LAYNE

PUMPS AND WATER WELLS

AN ALL YEAR ROUND MACHINE

IN BALMY SUMMER WEATHER

Cover your oil treatments penetration and waterbound macadam, bleeding surfaces and all other types of maintenance or construction requiring not more than 50 lbs. of loose aggregate per sq. yd. The Goroco is a separate spreading unit, attachable to any make truck and interchangeable in one minute. One machine will keep a whole fleet of trucks busy. Hopper 8 ft. 6 in. accommodates full tail-gate opening. No alterations or attachments to truck required. Quantity spread regulated instantly by a multiple slide-gate in hopper with lever-control in easy reach of operator. Uniform distribution is always obtained, resulting in economies in material and an even road-surface requiring less maintenance. Not more than two men required for operation. Eliminates the loss and danger resulting from small piles along the highway. Built to withstand the hard use of construction service.

WHEN WINTRY WINDS BLOW

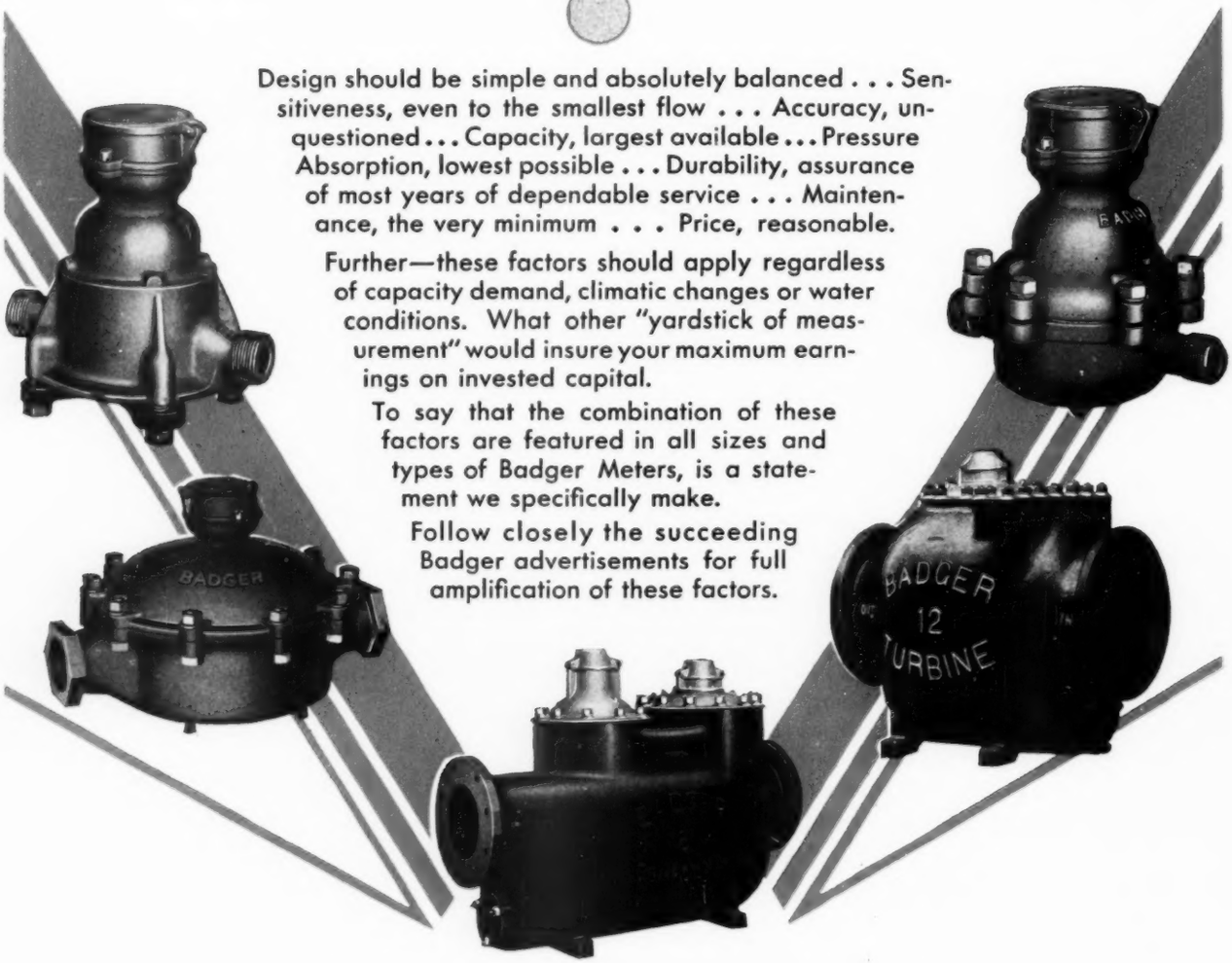
Cover icy highways with sand, cinders or salt. The Goroco will spread 1/4 lb. per sq. yd. or more. Uniform distribution. Up to 30 ft. widths in one operation. Ready for instant use and available for service at unusual hours. Not more than two men required for operation. Easily portable. Meets the situation where short spaces are covered — a truck load of material being used for a number of dangerous locations. The Goroco offers speedy relief from serious accidents and traffic tie-ups.

RUBBER TIRES OPTIONAL

THE GOROCO MECHANICAL SPREADER CO.

UPPER DARBY P. O. PHILADELPHIA, PA.

WHAT FACTORS govern your meter purchase?



Design should be simple and absolutely balanced . . . Sensitiveness, even to the smallest flow . . . Accuracy, unquestioned . . . Capacity, largest available . . . Pressure Absorption, lowest possible . . . Durability, assurance of most years of dependable service . . . Maintenance, the very minimum . . . Price, reasonable.

Further—these factors should apply regardless of capacity demand, climatic changes or water conditions. What other "yardstick of measurement" would insure your maximum earnings on invested capital.

To say that the combination of these factors are featured in all sizes and types of Badger Meters, is a statement we specifically make.

Follow closely the succeeding Badger advertisements for full amplification of these factors.

BADGER METER MANUFACTURING CO.
MILWAUKEE, WISCONSIN

Branch Offices: NEW YORK CITY CINCINNATI, OHIO CHICAGO, ILL. KANSAS CITY, MO. WACO, TEXAS
SAVANNAH, GA. SEATTLE, WASH. LOS ANGELES, CALIF. PHILADELPHIA, PA.

BADGER *Water* METERS

Three Austin Motor Pick-Up Sweepers before the famous Houston Convention Hall where the National Democratic Convention of 1928 was held.

Houston, Texas,
comes back to Austin Motor Sweepers

The City of Houston has had considerable experience with motor sweepers, having purchased various types since buying their first Austin. However, after thoroughly sampling the market, they have unmistakably demonstrated their final preference by their recent purchase of three more Austins.

This is no new story with Austin Motor Pick-Up Sweepers. So satisfactory had their first Austin proved itself in operating efficiency and freedom from costly upkeep that when new equipment was needed, nothing but Austin Motor Sweepers would do.

The features largely responsible for building Austin Motor Sweeper acceptance include: The standard 4-wheel Chassis, the Beltless Elevator and the 2-speed, 42-inch Oscillating Gutter Broom. Its dependable operation and the fine appearance it presents on the street are other factors that contribute to its great success with municipal authorities everywhere.

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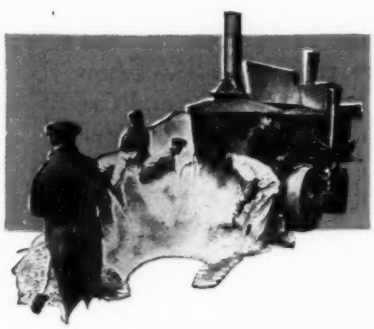

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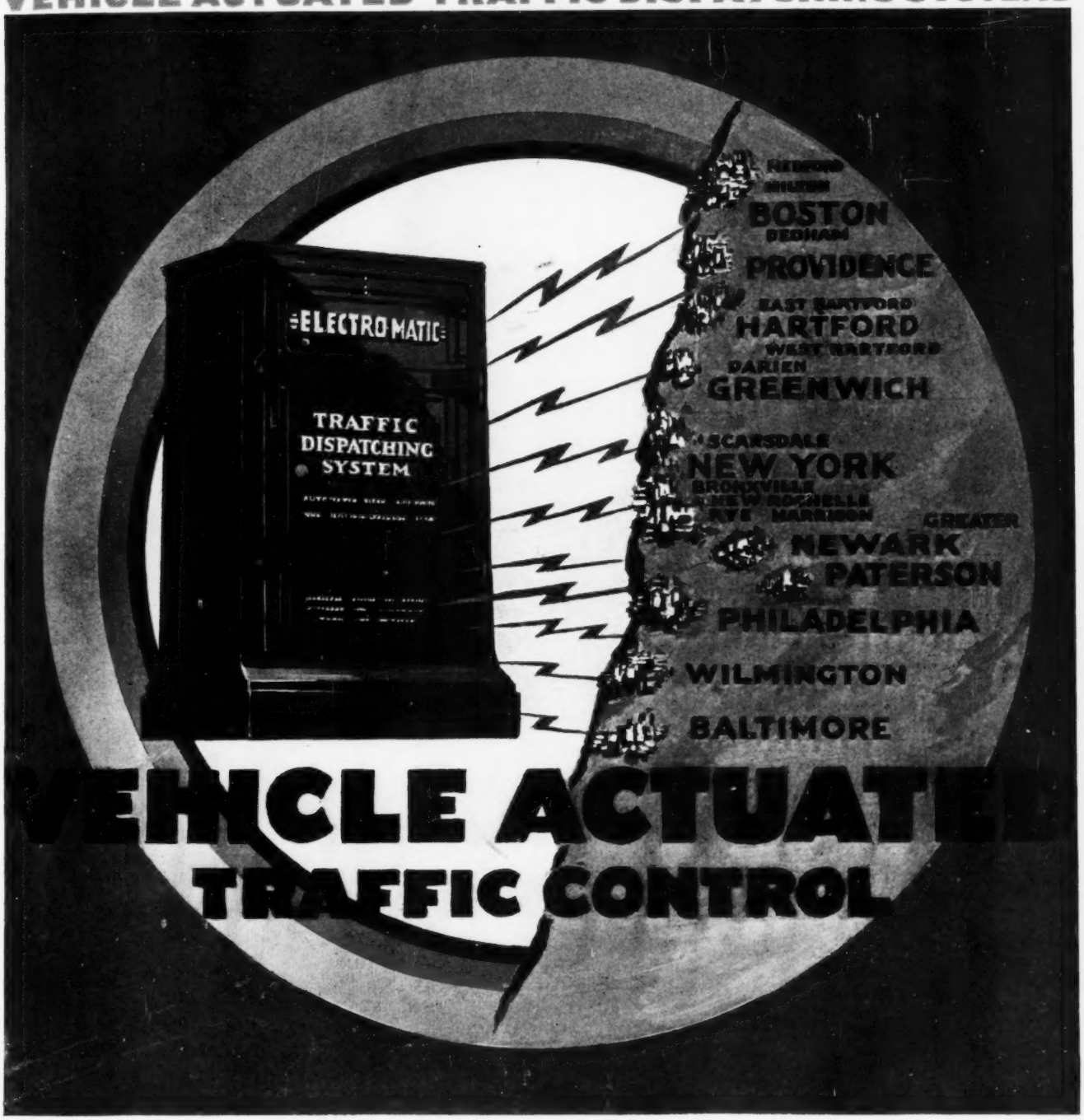

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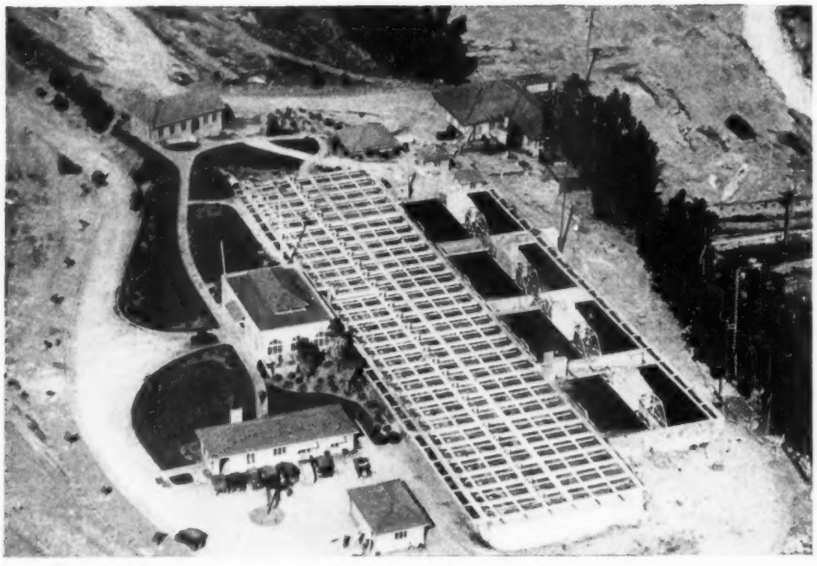

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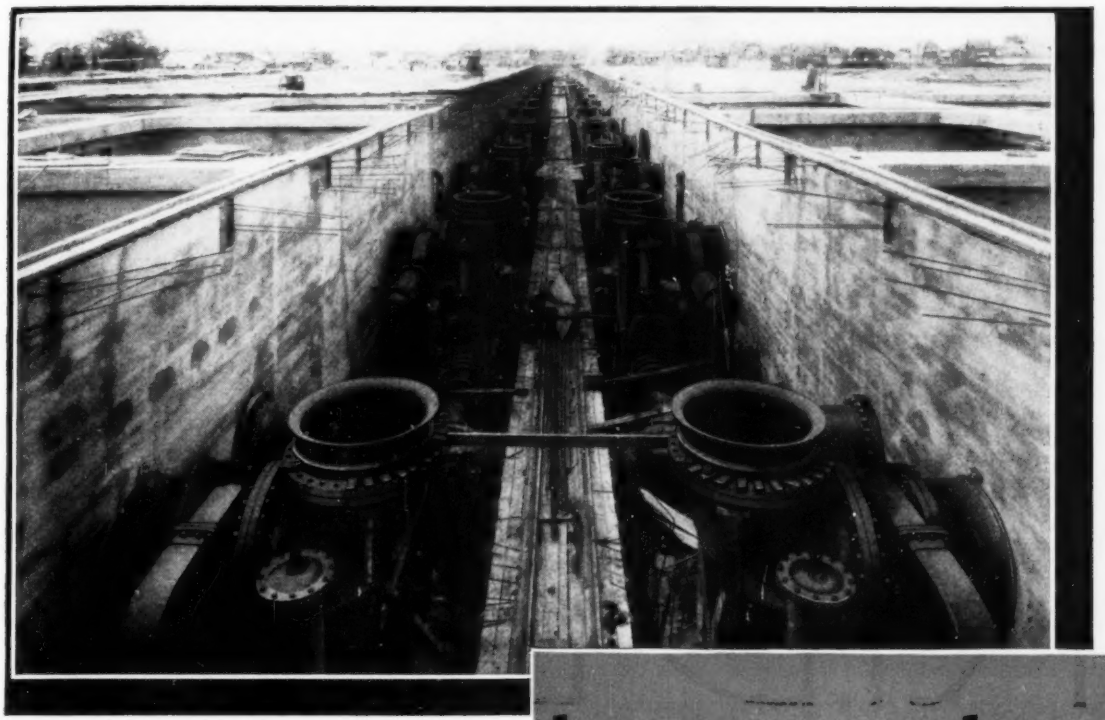

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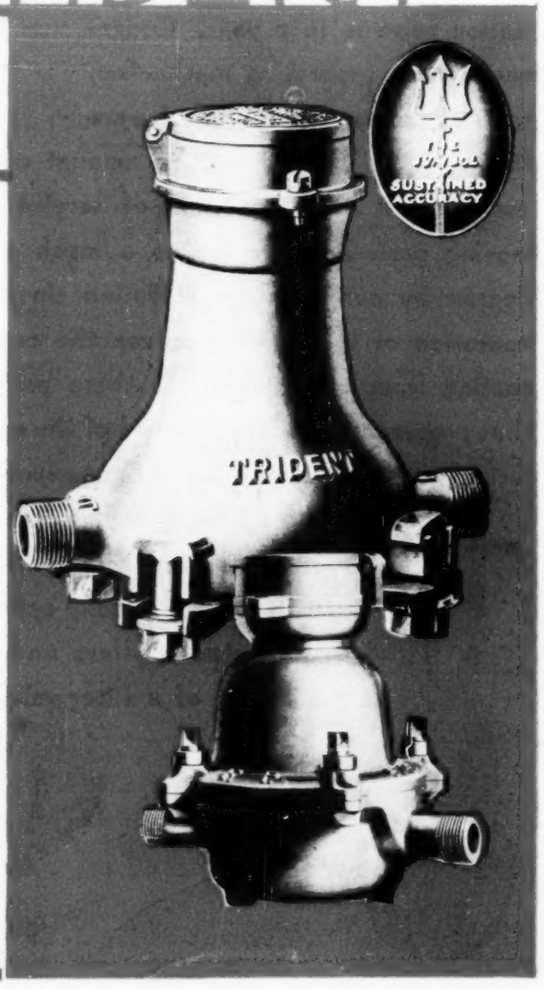

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JANUARY, 1931

Vol. XLIV, No. 1

The American City

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Outstanding Road Construction in Wayne County, Michigan

Construction of New Roads and Widening of Existing Roads During the Past Year

A LITTLE over 24 years ago, Wayne County adopted a county road system by an overwhelming vote. At that time there was not a mile of good road or a paved village street throughout the entire county. Existing bridges were narrow and were designed to carry loads not in excess of 6 tons. During the last year in conjunction with the State Highway Department on trunk line, Federal aid. inter-county roads, county roads and assessment district roads, a total of 1,384,225 square yards of concrete was completed, bringing the total yardage of concrete in the county up to 10,869,619. The yardage for this past year is the second largest total in the history of the County Road Committee. There are now 624,439 miles of improved roads in Wayne County, including 27.082 miles of roads over which jurisdiction has been relinquished to Detroit and other municipalities. The mileage of new roads built during the past season totals 31.958, and 50.935 miles of old concrete roads have been widened.

Some years ago, the Board of County Road Commissioners established 40 feet of concrete as the ultimate minimum width of its improved roads, and one of the largest efforts this past year has been to widen existing concrete roads of a lesser width to the ultimate minimum. Every effort is to be made to add to this mileage annually until every improved road in the county 20 feet or less in width conforms to the ultimate minimum width of 40 feet. The Board will, however, continue to build 20-foot concrete roads from time to time to serve local needs and to act as feeders to the superhighways, trunk lines, and secondary roads. Such service roads are designed for future widening, which will take place as soon as traffic demands increase to such an extent that the 20 feet of concrete becomes congested or unsafe. A 40-foot concrete road has a much greater traffic capacity than two paralleling 20-foot concrete roads, in addition to being a safer road on which to travel.

Widening the Fort Superhighway

There has been for years a narrow strip of pavement on a narrow right-of-way on Fort Street, lying between an existing 80-foot city pavement ending at Woodmere Avenue and extending to the Fort Street Bascule Bridge over the River Rouge. This narrow pavement has now been

SCHOOLCRAFT ROAD JUST EAST OF RIVER ROUGE BRIDGE NEAR LAMPHERE ROAD

replaced with a new concrete pavement 80 feet in width, additional right-of-way having been acquired to provide 120-foot width over-all, now known as Fort Superhighway. The Department of Street Railways of the city of Detroit relocated its car tracks and is now operating on them in the center of the 120-foot right-of-way.

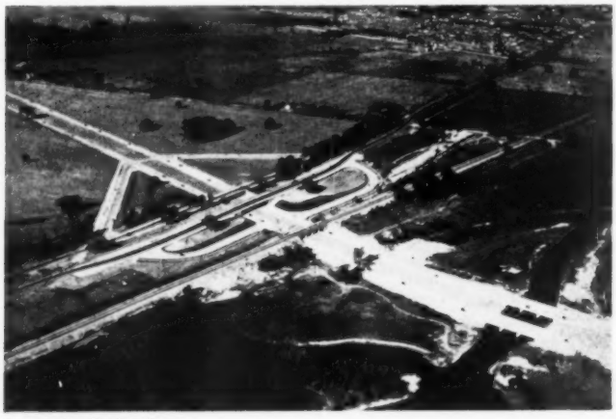
The work was done by county forces and carried on in such manner that traffic was maintained throughout the period of construction. Underdrainage was installed, curbs constructed, and the roadbed finished as a city-type pavement.

Upon completion of the grade separation, around which

REINFORCED CONCRETE SEA WALL APPROXIMATELY 7,800 FEET LONG, ON THE LAKE SHORE DRIVE THROUGH THE VILLAGE OF GROSSE POINTE SHORES

traffic is now detouring, this objectionable "bottle-neck" will have been eliminated and a suitable connection provided with the Fort Superhighway. Traffic on this southerly entrance to the city of Detroit has steadily increased and the elimination of this narrow roadway has been badly needed because of the congestion which heretofore existed.

Last year the Fort Superhighway was completed with a 204-foot width consisting of two 40-foot concrete pavements, providing four lanes of traffic in each direction. The original roadway on this extension was on a 66-foot right-of-way, and the additional land needed for widening to superhighway width was acquired partially by a replat-



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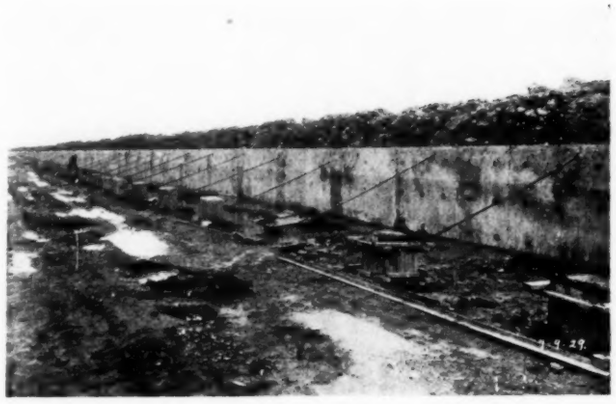
MICHIGAN-SOUTHFIELD GRADE SEPARATION

Aerial view of a separation of two superhighways which involves the construction of two 40-foot highway bridges in conjunction with a grade separation under the railroad and two highway bridges over the Rouge River



SEA WALL AT GROSSE POINTE SHORES COMPLETE, BEFORE BACKFILLING

ting of the abutting frontage back to the new superhighway line, and also by outright purchase and condemnation of frontage.

The acquisition of this right-of-way did not involve as many difficult features as were encountered in the business section of the city of Lincoln Park, because most of the property acquired was unimproved. It was necessary, however, to relocate sanitary sewers, sidewalks, water lines, police signals, and public utility poles, all of which required considerable study and time.

The Rebuilding of Jefferson Road or Lake Shore Drive

The agreement consummated a year ago with the village of Grosse Pointe Shores for the improvement of Lake

STILLWAGON CURVE ON MICHIGAN AVENUE, SHOWING THE OLD CURVE AND THE NEW FILL

Shore Drive from the Macomb-Wayne County line to Weir Lane, a distance of approximately 2½ miles, has now been practically fulfilled. Late last year the necessary drainage structures, including a retaining wall to hold the fill adjacent to Lake St. Clair, were constructed. The fill back of this retaining wall, which provides the subgrade for the concrete roadway, was also constructed last winter, which allowed ample time for sufficient settlement.

Early in the spring of 1930 construction was begun on one 27-foot concrete pavement with curbs, built to city grades and properly underdrained. Upon completion of this 27-foot strip and after sufficient time had elapsed for curing, traffic was permitted to use the new pavement, and the old 18-foot-wide concrete pavement, which was constructed in 1912 and 1913, has been broken, removed and replaced with another 27-foot concrete pavement. The fin-

FORT ROAD SUPERHIGHWAY AT THE NORTH LIMITS OF THE CITY OF LINCOLN PARK
Completed and opened to traffic this year. Two 40-foot concrete pavements on a 204-foot right-of-way

ished project now presents a section consisting of two 27-foot-wide pavements, with a 22-foot parkway in the center, on a 120-foot right-of-way.

The heavy traffic of this attractive driveway necessitated this improvement. It traverses a district of beautiful residences fronting on the drive on the west, and on the east one obtains an excellent view of Lake St. Clair. Residents along the drive were farsighted enough to realize that a wider pavement allowing free flow of the dense traffic would be less annoying to them than the narrow pavement which has served for the past seventeen years. Consequently, these frontage owners donated the necessary right-of-way, 120 feet wide, for the construction of the new highway. It is a fact that with the opening of this wider roadway, allowing free movement of traffic, considerable noise and objectionable odors from the starting and stopping of motors have been eliminated, particularly on Saturdays, Sundays, and holidays, when this roadway is heavily traveled by pleasure vehicles.

Improving Telegraph Road

Telegraph Road, a state trunk line, traverses in a north-and-south direction the entire distance across Wayne County, providing an excellent by-pass around the city of Detroit, has been widened to 40 feet of concrete the entire distance, approximately 20 miles. This widening has been done by the Board of County Road Commissioners, under contract with the State Highway Department.

A year ago the road was widened to a 40-foot width for a considerable distance, and a 10-foot slab was added in another section on the east side. This year an additional 10-foot strip of concrete was placed on the west side, providing a complete project within the county of a 40-foot pavement, underdrained and with curb installed where necessary, thus eliminating unsightly guard-rail at dangerous open ditches along this route.

A difficult feature on one mile of this road was encountered between Seven Mile and Base Line Road. In this area the work involved the excavation and disposal of approximately 150,000 yards of earthwork, the construction of a reinforced concrete bridge across the River Rouge, the relocation of the channel of the river, the revamping of a golf course which was cut in two by the opening of this roadway, and the construction of a grade separation with Base ine 204-foot Superhighway.

In order to complete this section as rapidly as possible, two large drag lines and two steam shovels were placed on the work with a sufficient number of trucks to dispose of the excavation, and the moving of the earthwork was completed at the rate of approximately 2,500 cubic yards per day for a total of approximately 60 working days.

Michigan Superhighway Widened to 204 Feet

During the last construction season the roadway on Michigan Superhighway was widened to 204 feet from the village of Wayne westerly to the Wayne-Washtenaw County line, and one 20-foot concrete pavement was constructed on the new right-of-way.

This superhighway is now 204 feet wide for a distance of approximately 19 miles with the exception of two miles lying between the River Rouge and Outer Drive, entirely within the old village of Dearborn, and a study is now being made which will provide either for the widening of this stretch of road or for its relocation, the results of the study to be recommended in the near future to the State Highway Department.

THE CONSTRUCTION OF SCHOOLCRAFT ROAD JUST WEST OF LAMPHERE ROAD
Here the problem of relocating the Rouge River off the 204-foot right-of-way was encountered; 54,000 cubic yards of excavation were handled to accomplish this work. In the background may be seen the fills set up for the future construction of two 40-foot pavements

The construction of this 20-foot concrete strip last year provided a lane for the use of traffic and enabled the removal of the old existing 18-foot pavement and the construction of a new 20-foot slab on the south side, thus avoiding any interruption to traffic on this important highway bisecting Wayne County in an easterly and westerly direction.

The construction of this 20-foot concrete pavement on the south side is now completed, and underdrainage has been installed through its entire length, several sharp curves have been eliminated which have been the scene of many accidents during the past, and two traffic lanes 20 feet wide in each direction have been provided with a wide parkway in the center.

Schoolcraft Highway, designated as a superhighway on the Master Plan, was started a year ago by acquiring the necessary right-of-way to widen the old 66-foot road to the new 204-foot superhighway width. During the winter the Right-of-Way Division was busy accomplishing this, and by the spring of 1930 sufficient property had been acquired to begin paving operations.

This superhighway is approximately 10 miles long and was built last year across the River Rouge, the river channel was relocated and a fill consisting of approximately 55,000 cubic yards of earthwork was constructed. A concrete pavement 40 feet in width has been constructed on this fill as far as Telegraph Road. From Telegraph Road westerly to the end of the project, one 20-foot concrete pavement has been built on each side of the right-of-way, providing two lanes of traffic in each direction, which can be widened to meet traffic requirements to the ultimate 40-foot width specified for superhighway sections.

Six Essentials of Traffic Law Enforcement

By **BURTON W. MARSH**
Traffic Engineer, Philadelphia, Pa.

SOME of the most important of the corrections of faults needed for the improvement of traffic law observance and enforcement are as follows:

Reasonable traffic regulations.—The adoption of the Uniform Vehicle Code by states and of the Model Municipal Traffic Ordinance by cities, is the best method of insuring reasonable and uniform traffic regulations.

Signs, signals and markings.—These must be effective, simple, sensible and wisely used. In cities, their application should be under the administration of a city traffic engineer.

Traffic police.—There should be, in all cities of any size, a separate traffic police division of adequate size. These divisions should be organized effectively to cope with their dispatching, enforcing and citizen-informing functions. Best modern practice calls for fixed post officers, a mobile patrolling squad, a group to enforce street use regulations, an accident prevention squad, a small group doing educational and officer-training work, a staff for keeping and analyzing records, and an adequate executive staff.

Traffic officers should be effectively trained in their duties. For this purpose, a continuing traffic officers' training school is recommended.

Improvement in enforcement machinery and procedure.—The chief executive of each city should analyze his traffic law enforcement machinery and its operation, and should require thorough cooperation and coordination between its several parts. He should insist that officers be not punished for diong their duty and that it is not necessary for them to spend undue time (especially their own time) in court on traffic cases.

There should be a prosecuting attorney to take charge of and effectively prosecute all important cases.

All traffic cases should be heard by the smallest possible number of judges remaining continuously on this work. Where the number of traffic cases warrants it, there should be a separate traffic court with adequate record-keeping staff and facilities, and sufficient judges so that all cases will receive thorough and mature consideration.

As an integral part of the traffic court, there should be a Violations Bureau or an agency to permit a simplified procedure for handling minor offenses by "non-repeaters." The National Safety Council bulletin entitled "Traffic Courts and Violations Bureaus" explains this idea and its application in detail.

The Model Municipal Traffic Ordinance, in an Addendum following Section 59, presents valuable recommendations for the establishment and operation of a traffic violations bureau.

Judicial officials hearing traffic cases should be high-grade members of the bar, selected for their qualifications for this work, and not for political reasons. Such judges should then be protected against being forced to yield to improper influence and against losing their position for doing their duty. To this end, the local bar association in cities might use its good influence to prevent their removal for political reasons.

"*Fixing.*"—The chief executive of the city, supported by leading civic groups, should insist that every traffic case be brought promptly to the traffic court or, in smaller communities, to the judge hearing traffic cases. Organized public opinion should then demand that each case be promptly decided and disposed of upon its merits, without consideration of political expediency or personal friendships. "Fixing" is recognized to be one of the greatest obstacles to securing satisfactory traffic law observance and enforcement—*it must not be permitted!*

The elimination of fixing, after heretofore mentioned corrections have been made, requires:

a. Strong executive officials in sympathy with good enforcement
b. A strong and properly qualified judge, likewise in sympathy with good enforcement
c. A powerful and informed public opinion constantly supporting the above-mentioned officials

Education of the public.—Finally, and most important of all, the achievement of satisfactory traffic law observance and enforcement is dependent upon the continuous, effective education of the public on all phases of traffic matters. Among all of the ways that communities "fall down" on traffic law observance and enforcement, their inadequacy along educational lines is the most important. In fact, few if any of the other corrections will be achieved and maintained without it. All safety organizations and civic groups should cooperate on making the general public really traffic-minded. A traffic commission, organized as recommended in the report of the Committee on Measures for Relief of Traffic Congestion of the Third National Conference on Street and Highway Safety, can be of great value in such educational work. It may often be the best group to sponsor such work. A good proportion, at least, of funds necessary for such educational work should be appropriated by the municipality, as this is one of the most economical end effective expenditures which the city can make toward improving traffic conditions.

—From a paper on "Law Observance and Enforcement Methods," presented at the annual meeting of the Highway Research Board of the National Research Council, in Washington, D. C., December 12, 1930.

Cut Down the Nation's Road Bill by Building Better Roads

An Interview with Colonel Charles R. Gow, Reported by Hamilton M. Wright

WE have reached a stage in this country where we must approach the study of highway construction from a more scientific standpoint. As a whole, road construction has not kept pace in this respect with building practice or other important branches of the construction industry. While many refinements of detail have been made in recent years in highway design and methods, from the economic standpoint present practice is little advanced from what it was twenty to thirty years ago. We Americans waste enormous sums in the upkeep of unsuitable types of roads and in tearing up and replacing old highways, thus squandering money which should be devoted to the building of additional roads.

Many of our important highways are not built substantially enough to meet the requirements of present traffic demands. An arterial road which is not equal to the traffic likely to use it involves a great waste of money. We frequently fail to discriminate between the different types of roads necessary to meet varying soil and traffic conditions. Many communities, in planning new roads, ask "How much have we to spend?" and not "What kind of road do the conditions demand?" Yet the volume of traffic the road must carry and the type of construction required in a given case are the really vital problems. Moreover, the public mind insists that awards for road construction shall be made to the lowest bidder. By lowest, they mean lowest by the absolute standards of American currency, but not necessarily lowest for the service the road will give to the public for each dollar expended.

We are still not very far from the days of the old type of highway builder, the tip-cart contractor, a familiar type of a generation ago. There have been comparatively few changes in construction procedure to meet new conditions such as we find in other branches of engineering and construction. There is a great opportunity for improvement in the mechanical operations of road building.

The public appreciate a good road when they drive over it. But the public has little conception of advanced engineering practice in road construction, of methods, materials, and the conditions under which they may be most economically applied.

Congestion Is Resulting in Diminished Driving

We are spending 1½ billion dollars annually on Federal, state and county roads, according to a recent estimate of the U. S. Bureau of Public Roads. We are probably spending more than half as much on city streets and their upkeep. Yet still more and more money is needed. Congestion is not only slowing down traffic, but is also resulting in the diminished driving of automobiles. An analysis by the Bureau of Public Roads indicates that between 500,000 and 1,000,000 miles of local roads must be built in the United States to provide for the future requirements of traffic. An intelligent approach to road construction problems is important not only to every driver, every business which employs a truck or delivery wagon, every shipper of freight by truck, every bus company, and every automobile manufacturer and agent, but to every individual, since all share directly or indirectly in the enormous cost of streets and highways.

Economical Salvage of Old Streets

There are thousands of miles of streets in American cities which are in very bad shape. Shall they be torn up entirely and new streets laid down in their places? Or shall local engineers study the problem and determine whether it is not possible economically to use the old street as a base for a new surface?

We are accustomed to hear public officials say in effect, "Here is a street that cost $200,000. Old type. Out of date. It is breaking up badly. Let's tear it up and install a new road in its place." But a more economical point of view is beginning to gain ground. Officials are beginning to consider whether it is not possible to salvage some of that $200,000. If the old foundation is solid but the surface is rough and wavy, it may frequently be possible to utilize the old construction in whole or in part and to supply merely a new top consisting of some appropriate material at a relatively slight expenditure of time and money.

If the road has broken up because of insufficient drainage of the subgrade, they must of course correct this fundamental fault before constructing a new road, by introducing adequate provisions for carrying off the ground water. They are beginning to appreciate the fact that each stretch of road is a specific problem in itself, and must be treated as such. It is not enough to say, "The last road we built has stood up in good shape. Let's build another just like it." The requirements of the proposed new road may be entirely different. The texture of the soil upon which it is to be built may vary from the previous case. A soil analysis must be made to find out whether the base will yield and settle, or whether it will swell under the influence of water. The materials at hand which can be most economically used may not be the same. It may have to support a heavier traffic, or perhaps a lighter traffic not demanding such an expensive type of construction. In fact, the specifications, foundations, surface, and texture of the soil, all lend themselves to scientific study.

Heavier Traffic Demands Stronger Roads

New conditions in traffic are demanding far more rapidly moving vehicles. Faster trucks, larger busses, and more automobiles, all proceeding at high rates of speed, demand a stronger type of construction than has heretofore been used on arterial highways. If a road develops rough spots, speedy and heavy traffic will increase them. The cheapest road is one whose initial cost plus future up-

keep is least over a period of years. One of the most important studies to which road engineers should devote themselves is to reduce the cost of upkeep. No one has yet determined how long the life of a road can be made. If the upkeep can be greatly reduced and the life of the road be greatly increased, a more substantial road carrying greater and heavier traffic is frequently justified, as it will prove cheaper in the end.

The automobile, truck and bus have become so firmly a part of our industrial fabric that we must consider their movement over the highways from a new point of view. When we observe many pavements constructed only a few years ago at large cost, being torn up and replaced, we cannot successfully maintain that the road-building industry has risen to anywhere near the level of engineering skill, durability, and economy which the importance of automotive traffic demands. We cannot afford to spend two billion dollars a year for roads which must be torn up and rebuilt, or practically so, in twenty years or less.

The Engineer in Analytical Study of Highways

But I believe we have reached the turning point. For many years the Bureau of Public Roads has been doing splendid educational work by precept and example, as also have engineers of the several state highway departments, and to some extent, of cities, counties and private owners. I believe that, generally speaking, the engineers associated with Federal, state, county, and city highway and street work are alive to more constructive thought in road matters. I feel that within the next fifteen years we shall look back upon our present road methods as very wasteful and unscientific. This result must come largely through the engineering profession, which must try out present highway construction and eliminate its defects, retaining only such present methods as are worth-while, and combining them with new ideas gained by experimentation and research. The analytical type of mind is needed in highway development. This type is largely produced by the engineering schools.

The U. S. Bureau of Public Roads has approached its task from the analytical angle and because of its great influence has effected many improvements. The technical colleges are now including the science of road building as a part of their curriculum. My own company has for thirty years maintained a laboratory for the testing and check-up of road materials and methods. Every problem that arises in the art is carefully analyzed. The laboratory is given a great variety of problems to investigate. It has always been its policy to make the results of the laboratory work available for public officials. Technicians of the company lecture at some thirty colleges and universities in the winter when they are less occupied with road work. New ideas in the paving field are investigated. Samples are sent in from all street work being done by the company and subjected to comparison with prescribed formulae. We also maintain a technical service department with resident engineers in all sections of the country. We have also installed road laboratories in many foreign countries. Several of the states maintain very fine road laboratories, but I daresay much of their very important work is unknown to the average citizen of those states.

A public appreciation of what is being done and of the problems affecting road making is vital to improvement because the public is the final arbiter of the sort of roads it will have. Since road construction is paid for from the public funds, it is more rigidly determined by the public influence than private construction of any sort. If we wish to build a skyscraper we call in an architect, but the public itself determines the sort of road it desires, though it is not sufficiently enlightened to exercise a discriminating opinion. A very marked distinction exists between the public mind and the private mind. The composite public mind is represented annually by the public authority which exists in the community. Fear of public criticism permeates the officials. But the individual members of the public are seldom, if ever, sufficiently advised to distinguish between what is right and wrong in road building.

As Thomas MacDonald, Chief of the Bureau of Public Roads, has remarked, a public official feels constrained to accept the low bid for road construction, after it has been made public, even though he feels the bidder cannot fulfill the specifications at the price quoted, because he does not wish to buld a skyscraper, we call in an architect, but the It would be morally incumbent upon him to accept the lowest bid if the bid were from a responsible bidder and provided the road were the best that could be selected for the purpose, and represented the greatest intrinsic value, dollar for dollar expended. But under our present system of bidding it is only occasionally that these factors are combined in a single bid.

I think the solution of our present situation lies in the education of the public so that people will take almost as keen an interest in their roads and highways as they do in their homes. An enlightened public opinion will reward and stimulate improvements in road construction.

EDITORIAL NOTE.—Colonel Gow, whose sound advice is quoted in this interview, is former chairman of the New England Committee of Thirty to investigate the St. Lawrence Navigation and Power Project, inventor of the Gow caisson method of installing foundations, Chairman of the Metropolitan Planning Division of Massachusetts, lecturer at the Massachusetts Institute of Technology, author of many books and articles, and now President of Warren Brothers Company, of Boston. He is recognized as an outstanding authority on road practice throughout the world.

A Residential Suburb as a Wild-Life Sanctuary

IF robins, bluebirds, flickers, chickadees, woodpeckers, and all of the hosts of other birds disappear from their ancient woodland communities as soon as these show signs of becoming residential subdivisions, then the newcoming human residents, many of them just escaping from cubbyhole apartments in congested sections of the big city, have lost one of their greatest potential pleasures. Why not keep both?

Thus reasoning, developers of Greenvale, in Westchester County, N. Y., incorporated a special nature-planning feature in their undertaking. To the profuse growth of dogwood elderberry bushes, and wild grape vines are being added many native mulberries and other food-producing shrubs and trees. Bird-houses are being installed, in a great variety of sizes and architecture, and automatic feeding devices provided. These measures, with complete protection against hunting, at first seemed adequate to ensure the familiar presence of birds and small furry animals about houses and grounds. But the shortest route of reasoning led to the conclusion that no home community is complete without pet cats, and that the unrestricted cat in this haven would speedily wax fat. Therefore, a novel clause now written into the restrictions covering the sale of all Greenvale lots prohibits the running at large of cats in the community.

The unusual seclusion, the splendid forest trees, and the dense undergrowth that are among the distinguishing features of this new subdivision provide opportunity for a permanent sanctuary. It is the hope of its sponsors that the plan may be adopted by other developers in the lower part of Westchester County from which birds and small wild animals are fast being driven.

Roadmaking in the Netherlands

By **CHARLES L. HOOVER**
American Consul General,
Amsterdam, Netherlands

THE construction of roads in the Netherlands is carried on by all the political units into which the country is divided—the national government, the provinces, the townships, local drainage boards, "polder" boards, and, in a few places, by the Department of National Defense and by private individuals. The national government, the provinces and some of the municipalities or townships have carefully formulated programs of road construction.

National Road Construction Program

The road improvement and building program of the national government at present includes approximately 110 miles of second-class roads, 1,017 miles of third-class roads, all now in existence, and the construction of 657 miles of new roads. All roads now in existence are to be converted gradually into first-class roads, and all new roads will be of this class.

The national roads are main highways which connect the various parts of the country and may be considered in a sense as military roads, although they are actually designed to meet the requirements of the increasing automotive vehicle traffic and to serve as the main arteries of land transportation, to be fed by the roads constructed by the provinces and other minor political divisions of the country.

Provincial Road Programs

Each of the eleven provinces comprising the Netherlands has its own program of road construction and improvement, which aims at the completion and amplification of the national system. The roads now existing consist of 249 miles of first-class, 698 miles of second-class and 1,182 miles of third-class roads, all of which are to be gradually improved so as to bring them up at least to the second class. The programs also call for the construction of approximately 86 miles of first-class and 108 miles of second-class roads.

Municipal or Township Road Programs

The provinces of the Netherlands are divided into "Gemeenten," or municipalities, which correspond in a way to townships, each urban center controlling a certain area of the surrounding open country, and certain of the roads in these districts are under the care of the municipalities. Some of the municipalities have more or less well-defined programs, but these programs are merely parts of the records of the city authorities and are not published. There are also local boards, which correspond in a way to town boards, which have the care of roads in their districts. These boards are those which have control of certain reclaimed areas known as "polders." Such boards are also particularly charged with the care of the dikes and the drainage in the districts that are under their supervision.

Types of Roads

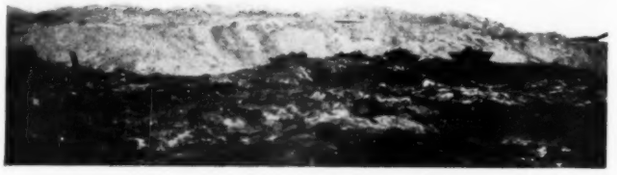
Every known type of road exists in the Netherlands, and any given highway may be partially built of macadam, brick, small paving-stones, Belgian blocks, wood blocks, asphalt or concrete. Consequently, no uniform type of roads exists. The width of the road is also governed by the special conditions existing in the particular locality where it lies. The government plans provide that most of the roads are to be 5, 5.5 or 6 meters, or approximately 16.6, 18 or 19.7 feet in width, but in some instances the width is to be as great as 12 meters, or approximately 39.4 feet.

The provincial roads are about 5 meters in width as a rule, although there is naturally much variation, the roads in the hilly or dune section being broader than those in

CANAL DIKE ROAD NEAR AMSTERDAM

Illustrating one of the difficulties encountered in road construction in the Netherlands

the "polder" districts, where they often follow the water-control dikes. In the future, it will be necessary to adapt the roads to be improved to the special circumstances existing in the place where they lie or are to be built. Some of the provinces have adopted a uniform width of 7 meters, or approximately 23 feet.



SAND FILL FOR A NEW ROAD BED

The sand has settled into the soft subsoil, forcing up the surrounding land. The bulge in the foreground was the bed of a canal before it was forced up by the settling of the sand

Classification of Roads

Owing to the fact that so many different types of roads, with respect both to width and to construction, exist in the Netherlands, it is very difficult to place them in any classification which will not be misleading to a certain extent. The "Motor and Bicycle Law" provides that the roads of the country are to be divided into three classes, but that the classification is to be made by the national government for the roads under its care, while the provinces and townships shall classify the highways for which they are responsible; it is stated only that "the roads may be placed in any one of the three classes in accordance with its suitability for heavy motor traffic," but no specifications are given as to the width or construction of the various classes. The result is that there is a lack of uniformity, and a road which is considered second class in one province may be a third-class road when it passes into another province, although it may be exactly the same kind of road.

According to a classification which has been published by the association of owners of commercial automotive vehicles, the roads in the northern sections of the country are mostly second and third class, the provinces of Groningen, Friesland and Drenth having no first-class roads at all. The quality of the highways improves to the southward, the provinces of North Brabant and Limburg having no third-class roads. Those in the former province are about equally divided between the first and second classes, while those in Limburg are all first class.

Many of the so-called asphalt roads are merely macadam roads which have been light-surfaced with asphalt, but, although the maintenance of such roads is expensive in comparison with really first-class asphalt roads, they serve their purpose as well as long as they are kept in good repair.

Total Length of Roads

The total length of the existing roads which are considered as "surfaced" roads is 15,816 miles, of which 11,990 miles are under the management of the townships and other local units, the national system being 1,123 miles and the provincial roads 2,704 miles.

Construction Problems

With the exception of a belt of sand dunes which follows the North Sea along most of the coast of the Netherlands, the western third of the country lies below the level of the sea, and the soil is composed of alluvial deposits of unknown depth. Much of the surface soil in this region consists of vegetable mold, often in the form of peat, below which are beds of sand and clay. Consequently, the problem of constructing a roadbed which will sustain heavy traffic is a serious one.

In olden times roads can scarcely be said to have existed, the canals forming the most important means of communication. Towpaths were provided on the dikes constructed along the canals, many of which were considerably above the surrounding land, and these paths gradually came to be used as highways, which were sufficient for the vehicular traffic of olden times. In the low-lying sections of the Netherlands, these towpaths have tended to fix the course of most of the existing roads and, as time went on, they were improved and widened, but in many cases it has been difficult to increase the width, because the canal lay on one side, while buildings and improvements of various kinds came into existence on the other side. Also, it is often difficult to obtain dirt for increasing the size of the embankment, although this is usually accomplished by hauling the sand dredged out of the ship canals and ship lock sites to the roadway in barges.

One of the accompanying photographs shows a typical dike road near Amsterdam, with the canal on one side above the level of the land on the other side. Where the grade is to be raised to a considerable height, the weight of the sand sometimes causes it to sink into the soft soil or, rather, to displace the soil by forcing it aside. An instance of this is shown in the second photograph, the bulge in the foreground having been the bottom of a canal before the sand in the background sank. So soft is the subsoil in many places that a galloping horse will cause the surface to undulate visibly.

In the dune regions along the North Sea and to the southward of the Zuider Zee, conditions are not so bad, although the sand is by no means an ideal material for the foundation of a road, as it tends to settle and to move so that the roads soon become wavy.

The country itself possesses practically no material from which roads may be built, for there are no stone quarries or gravel beds except in the narrow strip lying between Belgium and Germany, and it is accordingly necessary to import from Germany practically all of the material used for the construction of the foundation and for the surfacing of the roads where brick manufactured in the Netherlands are not used.

Financing of Road Construction

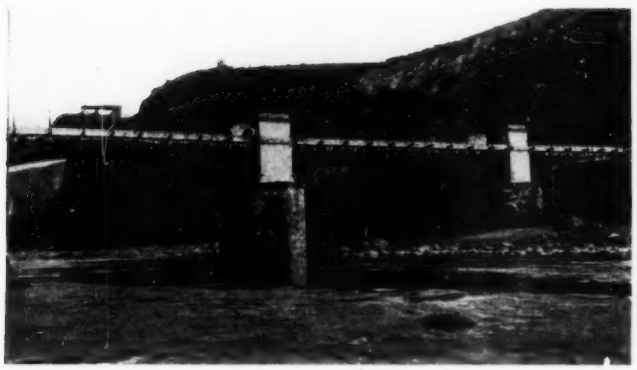
The principal source of funds for the construction of roads in the Netherlands is the vehicle tax, which is applicable to all classes of vehicles, but particularly to the automotive vehicles and bicycles. The tax on bicycles is 2.50 florins a year, this being equivalent to $1, while the tax on motor vehicles is based on the weight, the charge running from 10 florins or $4, for motorcycles weighing not more than 132 pounds, up to 8 florins, or $3.20, per hundred kilos for cars carrying more than 7 passengers. Under this schedule, a bus weighing 3,000 kilograms would pay 240 florins, or $96 per year. The tax on motor-trucks is 6 florins, or $2.40 per hundred kilos, with a minimum of 48 florins, or $19.20.

The vehicle tax produced 15,928,227 florins, or approximately $6,371,290, in 1929, and the national government budget provided for the expenditure of 25,150,000 florins, or $10,060,000, on road construction in 1930. The law specifies that the income of the road fund arising from the vehicle tax is to be augmented so far as may be necessary by appropriations from the general funds of the government, as well as by advances of such amounts as may be required to carry on the work, these advances being chargeable against funds which may become available in later years.

The part of the road fund not required for work to be done under the national program is divided among the provinces on the basis of the mileage of roads existing in each, but in no case is the amount available from this fund sufficient for the carrying-out of the provincial programs, and the deficit is made up by appropriations from the general funds of the provinces which have no special tax for roads. The cost of maintenance of the national and the provincial roads is paid from the road funds of the bodies concerned. The townships and local boards appropriate from their general funds such sums as they require for the maintenance and construction of their roads.

Mexican Federal Highway Construction

By **P. K. SCHUYLER**
Formerly Bridge Engineer, Comision Nacional de Caminos



ARCH BRIDGE, MEXICO-LAREDO ROAD

A COMPREHENSIVE plan for constructing a system of Federal highways was laid down in a law passed by the Mexican Congress on March 19, 1925. Funds for carrying on this work were provided by a tax placed on gasoline equal to 5.7 cents (American) per gallon, and by a tax placed on the manufacture of tobacco. Work was undertaken immediately on the more important portions of the highway system, and great progress has been made. The first roads on which construction was undertaken were adjacent to Mexico City, and connected Mexico City with Pueblo, Pachuca and Cuernavaca.

Mexican engineers who had had training in highway and bridge construction were not available, and so the Mexican Government determined to employ a number of experienced highway engineers from the United States to initiate the construction program. The American engineers worked with Mexican assistants, and in a short period of time the Mexican engineers developed so that they are now carrying on the comprehensive highway construction program.

The Comision Nacional de Caminos, or the Federal Highway Commission, was placed in charge of this work. These roads were built and are being maintained directly under the supervision and direction of this agency of the Federal Government. This is a departure from the United States practice, whereby the highways were constructed and are maintained by the various individual states or the political subdivisions of the states, although the United States Government participates by appropriating Federal Aid funds to be expended by the individual states subject to the approval of the Bureau of Public Roads.

Local Problems

A number of problems were encountered in undertaking the construction programs. Local road surfacing materials had to be experimented with, and where satisfactory were utilized. Traffic was not heavy enough to warrant the construction of concrete highways. Steel proved to be expensive in Mexico, whereas concrete could be built at about the same cost as in the United States, and stone masonry could be built cheaper. Stone masonry and concrete were therefore used to a large extent in the construction of bridges and culverts. Some difficult problems in location were also encountered, because many of the old trails built centuries ago in Mexico were constructed for the passage of animals only and followed very steep grades and had poor alignment. In a number of instances entirely revised locations had to be adopted so as to elimi-

STEEL SPAN WITH CONCRETE APPROACHES, SALADA RIVER, MEXICO

nate the steep grades existing on these trails, which in some instances ran as high as 25 per cent.

Facilities for shipping materials were not always adequate. For instance, the state of Chiapas had no railroad facilities and has never before had a road passable to automobiles at all seasons of the year. In this state the shipping of materials and supplies proved to be a rather difficult problem. Numerous different types of country were encountered. The north of Mexico is to a large extent desert, whereas in the central portion there are very high mountain ranges, while along the coast and in the southern portion tropical jungles exist. In each of these sections roads suited to the country had to be developed and built, making use of local materials as much as possible. In the vicinity of Mexico City a volcanic stone named "texontle" was found, which when used for surfacing and given three oil treatments provided a most satisfactory and durable surface.

Labor

The labor, although plentiful, was entirely untrained, and much time and effort had to be spent in directing and instructing operations. Work could oftentimes be accomplished by hand labor in place of machinery, as the hand labor proved to be more economical because of the low rate of wages. Laborers were paid approximately 75 cents (American) per day.

Concrete Bridges for Dry Rivers

Reinforced concrete had never been used for highway bridge construction in Mexico and it was necessary to work up a series of standard plans for bridges and culverts and to instruct the field organization as to methods of construction. Many of the rivers in Mexico provided unusual problems, having little or no water during the dry season, whereas in the wet season they became raging torrents, and in the construction of bridges it was often hard to visualize the amount of water which would pass down the waterway during the rainy season.

Systematic Construction

Since the beginning of this construction program, work has been carried along more or less consistently, although a number of interruptions have occurred. The number of automobiles in the republic of Mexico has increased by leaps and bounds, and the demands for additional highways have occurred. At the present time the Federal Government is engaged in the construction of a rather comprehensive system of highways connecting the largest cities in the republic. When completed, this will be of tremendous benefit and advantage to the country. The completion of this system will require a number of years to accomplish.

More Road Building Urged to Stimulate Return Prosperity

ABOUT 75 per cent of the cost of road building goes to labor directly or indirectly. Road building means a stimulation of business in cement, brick, stone, steel, road-building machinery and automobiles, and the immediate result of such projects would be a rapid increase in employment, according to a recent statement by A. W. Childs, Chief of the Automotive Division of the Department of Commerce.

Mr. Childs spoke through Radio Station WOL at Washingtong, D. C., in connection with the annual convention and Road Show of the American Road Builders' Association in St. Louis, January 10 to 16. He sees the prospects for larger road programs in 1931 as exceedingly bright, bond issues for more than $250,000,000 having been voted by the states in November. To quote:

"Tonight I want to talk to you about the high road to prosperity, the most popular road of all time. The United States is seeking to resume that road after a 'detour' through business depression. We can well afford to consider increased road construction as a valuable aid.

"With more than 50 per cent of the road-building dollar going directly to labor, and something like 25 per cent more going indirectly, by way of the production of machinery and materials, the immediate result of larger road programs would be a rapid increase in employment. More roads would create sales for more automobiles, in turn giving more men jobs; private business would follow the example of the Government and increase its working capital, and better business conditions in general would result.

"Road and street construction and maintenance is the largest market in the United States for cement, sand, crushed stone, vitrified brick and asphalt. There is a tremendous consumption of steel in building bridges, reinforcing pavements and producing road machinery.

"Since the roads and streets belong entirely to the people, the people have an opportunity to solve their own unemployment problem by putting the tremendous power of increased construction to work.

"The number of people engaged in the building and maintenance of roads and streets has never been determined accurately. A rough approximation can be made by considering that in the working season of about eight months, the average expenditure is about $250,000,000 a month. It is readily seen that $125,000,000 a month is being paid direct to labor. This is an important item in the national labor budget.

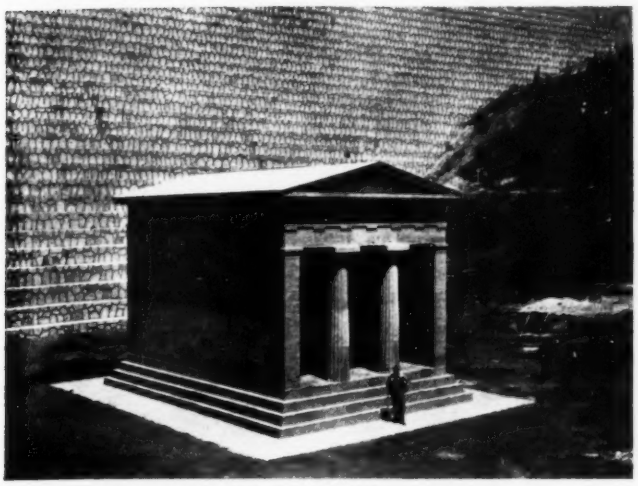
"On Federal-aid construction alone—a comparatively small part of the total expenditure—47,686 men were employed in September, 1930. Road and street maintenance and the locally financed work of the cities, counties and states employ many times as much labor as Federal-aid construction. More and more people are being employed in highway work.

"This appropriation for 1931 is already being spent by the state highway departments, and the funds for 1932 may be made available in advance by congressional action. President Hoover's Emergency Committee for Employment has been asked by the American Association of State Highway Officials to foster an emergency Federal appropriation of $250,000,000 for highway construction.

"Of course, a highly desirable thing in this unemployment crisis would be to start the wheels turning in all the factories. But until that can be done, the immediate appropriation of funds for public work will create a host of temporary jobs. Maintenance and repairs of public works have possibilities of expansion and many such jobs may be undertaken now instead of being put off. The present is a favorable time to do such work as the elimination of dangerous curves, the cutting-back of roadside banks that obscure vision at curves, the widening of grades in anticipation of future surfacing, the repairing and painting of traffic signs and other local betterment work designed to improve the safety of highways, which can be started quickly without extensive preliminary planning."

Athens to Relieve Its Thirst

By W. P. CHRISTIE
Ulen & Company, Contractors,
Lebanon, Ind.



THE TREASURY OF ANCIENT ATHENS IN REPLICA
It forms the entrance to the Valve Chamber and Inspection Galleries of the Dam

THE capital of Greece, ancient center of sculpture and liberal arts, is about to win its age-old struggle against thirst. Athens was founded about 1259 B.C. and is believed to be the oldest city of continuous inhabitation in the world. Throughout its long history it has scarcely ever been free from serious difficulty in securing an adequate supply of water. As early as the sixth century B.C., rigid laws were enacted by Solon to conserve the meager sources, but despite his efforts, the populace is said to have suffered. Not until several centuries later when the Roman Emperor Hadrian and his successor, Antoninus Pius, built the Hadrian aqueduct, was any reliable supply provided.

The Roman aqueduct was completed about the year 140, and served the city until some time in the Dark Ages, when invading Goths and Vandals were in control of Greece. During that period of destruction the aqueduct was damaged, abandoned, and finally lost to the memory of the people. Not until the time of our own Civil War were its possibilities as a source of supply rediscovered. It was then cleaned and repaired, and up to the present time has been in service.

In 1922 the per capita supply of Athens was only 1½ gallons, and during that year the enormous influx of Greek refugees from Turkey began. Their arrival, and other factors, almost tripled population within a period of two years. Probably no other city in the world has undergone such a precipitous expansion, or faced such a sudden emergency with respect to water. Yet within a period of months the Greek Government not only overcame the emergency but also proceeded with plans for an adequate supply.

In this article it is not practicable to give details of the program, but the principal features of the work, which was performed by American engineers and constructors, are here briefly explained.

Emergency Measures

To meet the immediate necessity, it was decided to increase existing sources of supply wherever possible. These consisted of springs, artesian wells, and galleries driven into water-bearing strata of rock. As little as a few hundred cubic meters per day was a source worth developing, and nothing was overlooked that would swell the total.

Existing springs were cleaned out and new ones were developed. Artesian wells were equipped with air-electric boosters. Galleries were driven further into the rock, and the Hadrian aqueduct with its feeder channels was cleaned and rehabilitated. To relieve the consumption of drinking water, a salt-water pumping-station was built, and later, when a tunnel heading of the new system struck water, this supply was fed into the aqueduct.

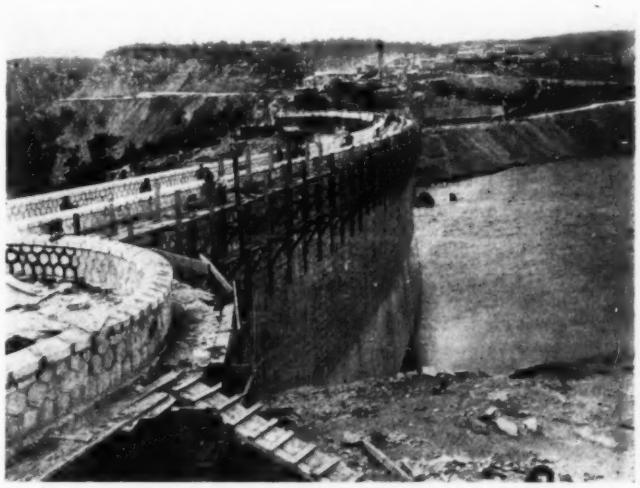
Emergency or provisional work, as it was called, raised the supply from 1½ to 3 gallons per capita. This amount was later doubled by water from the construction tunnel, raising the total to 6 or 7 gallons, varying with the rainfall. A further increase of 10 or 11 gallons will be obtained from the new system, making an anticipated total of 16 or 18 gallons. In comparison with New York's 131 gallons, or Seattle's anticipated 150, the Athens supply does not seem very great, but it compares favorably with other cities of the Mediterranean.

The New System

Independent of all emergency work, an additional system is being built to supply the cities of Athens, Piraeus and Phaleron, together with the territory immediately adjacent. It includes a dam which now impounds the Haradra and Varnava Rivers, a delivery tunnel which will carry the water to Athens, and a system of pipe lines and reservoirs for distribution. Of these three features, the tunnel represents the most difficult problem, and the dam is the most spectacular.

Marathon Dam

The dam is built near the historical battlefield of Marathon, where Persian forces under Darius, about twenty-



UPSTREAM FACE OF MARATHON DAM, LOOKING TOWARD THE CONSTRUCTION PLANT AND CAMP
The quarries are seen in the upper left of the picture, and the rough coping stones are shown being dressed in place

four centuries ago, were defeated by the Greeks. In some respects it is unique among engineering structures of the world. Its surface is faced with Pentelicon marble, such as that used in the ancient temples surmounting the Acropolis. All the stones, which are laid in a mosaic pattern, were shaped and surfaced by hand. Architectural perfection has been carried even to the chamber for controlling valves. Its entrance is a polished marble replica of the old Athenian Treasury at Delphi.

Throughout construction operations, citizens of the country have taken a great interest in the project. It is not merely a thing of utility; but also a structure of impressive beauty. Within recent months a petition has been submitted to the Government asking that the valve chamber be turned over to one of the churches as a place for religious service.

Modern principles of gravity type construction have been applied throughout on the Marathon dam. It has a safe anchorage in solid rock and was built with copper joints for expansion. International galleries are provided to permit continual inspection of the structure, and, as a precaution against collapse during earthquakes, it is built on the arc of a circle.

The body of the dam is composed of concrete, which was placed in the beginning by four lines of railway resting on concrete piers. Later, as the structure rose in height and decreased in width, one track after another was eliminated, until only one was left at the finish. In all, the concrete work totaled approximately 233,000 cubic yards, which was placed in 21 months. Coarse aggregates were made of crushed marble, and fine aggregates of the same material ground to proper size.

The dimensions of the dam are: width at base, 154 feet; width at crest, 15 feet; height above old stream bed, 130 feet; length of crest and spillway, 1,200 feet. The entire project, from excavation to completion of the marble facing, required about two years and a half.

Late last year the structure was inaugurated by an impressive ceremony in which officials of the Government, members of the Orthodox Church, diplomats and prominent citizens participated. Premier Venizelos himself was present. At the time of the ceremony water in the reservoir was rising steadily and its accumulation was heralded as a forerunner of good fortune to the country. When the reservoir is full it will contain about 1,500,000,000 cubic feet.

Delivery Tunnels and Syphon

Water from the reservoir will flow under the Parnes Divide through a horseshoe-section tunnel 8½ miles long, then, by shorter tunnels and a cast iron syphon line, about 5½ miles to the main distributing reservoir at Athens.

Originally, this long tunnel, known as the Boyiati, was not a part of the plans. A more circuitous route involving numerous small tunnels and syphon lines had been provided. The original route would have required about 66 different headings, each with its service road and equipment, which would probably have cost almost as much as the tunnels themselves. Under recommendation of the Ulen engineers, a shorter route, including the large Boyiati tunnel and two small ones, was chosen. The smaller ones have a cross-section 4 x 5 feet, but the Boyiati is considerably larger, having a section 7½ x 7½ feet. These dimensions give an area greater than that necessary for the flow; but with the extra area it was possible to employ efficient methods which are not feasible in small headings. Economies of the shorter route and the larger cross-section of the main tunnel have been clearly demonstrated.

Where the tunnels pass through earth, they are lined with pre-cast concrete blocks, provided with tongue and groove. Six of these blocks form the perimeter. One is used for the invert, one for the crown, and two on each side. They are laid close up to the heading in order to reduce the amount of timber shoring, and are followed on the next working shift by grouting operations. On stretches passing near any low land, special precaution is taken against leaks. Succeeding sections are blocked with a bulkhead and filled with air at a pressure of 4 or 5 pounds per square inch. Any leak is revealed by the noise of escape and may readily be sealed by an application of grout, which is forced into place by pressure.

In rock sections the lining is all Gunite, shot directly on the rocks and finished to proper shape.

During the construction, about all the well-known difficulties of water, soft-clay and shifting material have been encountered. In one instance, while heading into porous rock, a deluge of water burst forth and carried débris 300 meters from the face. The flow was approximately 350 liters per second. In other instances pressure pushed up the floor as much as 2 or 3 feet in 24 hours. Often it broke the timber shoring several times before dying down sufficiently to permit the placing of concrete blocks. On occasion, the pressure rose to 240 pounds per square inch, which necessitated tight sheeting with 6-inch I-beams.

However, a satisfactory rate of progress was maintained, and what seems to be a record for one day's driving in this sort of material was established. It amounted to 53.8 feet.

Distribution Reservoirs and Lines

Distribution begins with a Central reservoir of 42,000 cubic meters located just outside of Athens. From there it flows to eight other reservoirs varying from 100 to 5,000 cubic meters and serving principally to reduce pressure. About 10 per cent of the district, consisting of the highest section of the city, requires pumping service. This area is to be handled by a new pumping-station and a high-service reservoir.

When Greek Governmental Officials Meet American Contractors

—the result is a dependable water supply for Athens, her first since the Hadrian aqueduct was destroyed by Goths and Vandals. Incidentally, a brilliant precedent in public works financing is established, possible for effective use at home. Half of the $10,000,000 development bond issue was taken over by the contractor, and half by the Bank of Athens. Design, construction, and the operation of the new system during the 20-year lifetime of the bonds were coordinated under a three-way agreement between these two agencies and the Greek Government. Under it the latter alone has authority to terminate the agreement.

A cast iron pipe line system totaling about 500 miles distributes the water to points of consumption. The lines vary from 80 to 500 millimeters in diameter and are laid on both sides of the street. In some instances, the streets are less than 20 feet wide and could be served by a single line, but the officials insisted that two lines be used, to avoid disturbing the pavements. Generally they are laid under the sidewalks, but in many localities this is made impracticable by an encroachment of areaways beyond the property line. There are so many of these and they have been in use for so long that forcing the inhabitants to abandon them was out of the question. It would have assumed the proportion of a serious political issue.

Fortunately, in such localities it was possible to lift out the marble curbstones that lined most of the streets and to place the pipe lines directly beneath without disturbing the areaways. These curbstones have been a fortunate factor with respect to economical placing of the lines.

At the present time, service is being rendered to about 20,000 customers, who are supplied by the old Hadrian aqueduct. The new system will not be in complete operation for some months.

Financing the Undertaking

The Athens project, including emergency work, amounts to about $13,000,000. It is financed from several sources, including a bond issue of $10,000,000, half of which has been taken by the contractor and half by the Bank of Athens. Design, construction and financing, together with operation of the system during the life of the bonds, are all coordinated under a three-way agreement between these two agencies and the Government. Of course, the Government can terminate the operations of the Bank and the contractor by taking up the bonds; but otherwise they will continue for a period of 20 years.

An arrangement of this sort may seem strange in the United States, but it has made possible the building of many foreign public works that otherwise could not have been built. A similar procedure or some modification thereof may come into use in America. It can be applied without a public bond issue, and could permit a public body to purchase its utilities on an installment plan. Ordinarily, if a city has reached its bonded limit or for other reasons cannot raise a considerable sum of money in advance, it cannot own its utilities. They must be installed and owned by private corporations. Such a city, when it is hard-pressed for utilities, and is opposed to private ownership, may find a solution to its difficulty in some modification of the Athens plan.

THE DOWNSTREAM FACE OF MARATHON DAM

Preliminary Work

On a project of this sort, the preliminary and auxiliary work has many ramifications that do not exist in the domestic field. When the project started, it was not possible to find a working force physically able to carry on the work. A great many of the workmen were refugees who had been living under adverse conditions, and did not have strength enough to do a day's work, therefore it was necessary to build a commissary and employ a dietitian to develop a suitable diet. The men were kept on proper food, provided with suitable sleeping quarters, and forced to sleep in fresh air, for many weeks. Within three or four months their strength was brought up to normal. Incidentally, the commissary, serving three meals at 27 cents per day, turned back about $25,000 to the Government. At times, as many as 3,800 men were on the payroll.

A great amount of auxiliary work was involved. It was necessary to build a power-house, transmission lines, railways and crushing-plant to serve the power and material requirements of the job. The work had to be policed and protected against various acts resulting from habit or unfamiliarity with the purpose of the project. Right of eminent domain had to be exercised in ways that could not be foreseen. As the work progressed, new engineering and construction features were developed jointly with the Government engineers. Native workmen had to be trained, and various other expenses were involved through peculiarities of law and custom. For these reasons it was necessary to proceed under a cost-plus-fee arrangement.

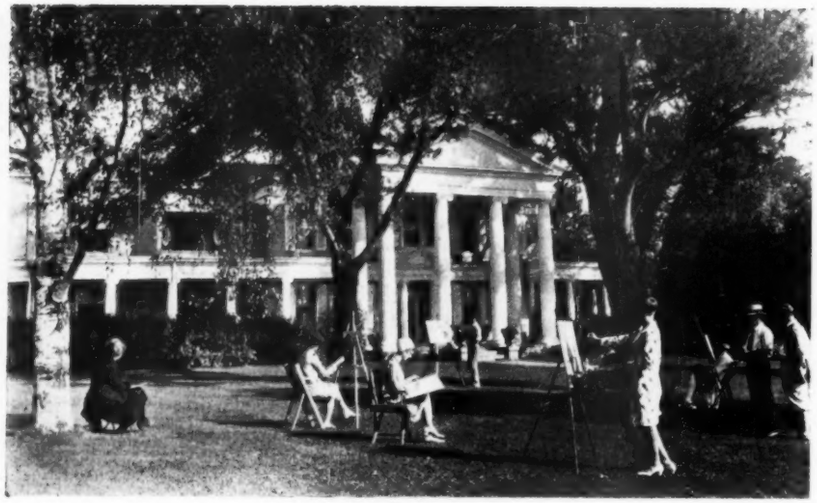
On projects of this sort, with both parties doing their best, it is often almost impossible to prevent misunderstandings, but on the Athens job the collaboration between the contractor and the Government has served to create rather than destroy the good-will between their respective nations.

The Grand Rapids Town Forest

HOW a town forest may be established, and how its establishment may be made a valuable educational project, is being demonstrated in Grand Rapids, Mich. An account of the undertaking, as written by Frank L. DuMond, Curator of Education, Kent Scientific Museum, is presented by the American Tree Association in its George Washington Bicentennial Tree Planting propaganda (1732-1932), with the suggestion that such a town forest might appropriately be dedicated as a George Washington Memorial Forest.

The purposes is stated as being: (1) to establish a city demonstration area on which children of Grand Rapids may learn to plant trees; (2) to enable the city's youth to become intimately acquainted with the important forest trees of their own state; (3) to provide an outdoor laboratory where trees of various species may demonstrate their ability to grow in Michigan; and (4) to develop "tree consciousness" on the part of young and old.

The planting plan calls for the creation of a forest of 50 acres of old fields in Aman Park, through use of 60,800 trees, planted at 6-foot intervals, or 1,210 to the acre. The trees are to be planted within a period of 5 years, by the setting-out of 10 acres (12100 trees) per annum. Dr. DuMond says, "To make this plantation of the utmost educational value, each child should be limited to the planting of 25 trees, which is sufficient to enable the planter to grasp the technique without tiring." Many trees can be had free from the State Forester.



THE OGLEBAY MANSION
This fine example of Southern post-Colonial architecture has become a museum housing historical and art treasures—and an art center

Wheeling's Serves All

And Writes a New, Broader Definition of the Term—"Public Recreation"

AVERAGE citizens of average cities of 65,000 people may dream of possessing, one day, a country estate, but the citizens of Wheeling, W. Va., already have realized the fulfillment of such a dream. They are joint owners of a 750-acre country estate at the very doorsteps of city homes, a vast playground and a center of education and culture for the citizenry of a metropolitan population of 200,000 people.

Their estate is the municipally owned Oglebay Park, two miles from the city line and spreading its rolling acres over the tops of the rugged Ohio County hills. More than 125,000 people used this big recreation center between May 30 and November 1, 1930. But the influence of this institution has extended far beyond city boundaries. Thousands of visitors to Wheeling are directed to Oglebay Park—visitors from all parts of the United States and from many foreign lands. Their impressions of Wheeling are inevitably enhanced by their visits to a park of such inspiring beauty and stirring accomplishments. They must be told how the city achieved so great an asset. This is the story:

Nearly thirty years ago, Earl W. Oglebay, a Wheeling and Cleveland, Ohio, capitalist, acquired Waddington Farm, the acreage which has become Oglebay Park. Agriculture was his hobby and he set to work with his great resources of energy, taste and wealth to make of Waddington Farm a model institution.

Many bare acres were planted with native and exotic trees. Forested areas were carefully preserved and improved by scientific direction and attention. A square old dwelling on the highest hilltop, already a century old, was made the nucleus of a magnificent mansion—the residence eight months of each year of Mr. Oglebay and his family. Near this mansion was constructed a club-house with a dance floor and guest rooms. A conservatory was built and filled with tropical plants. A series of greenhouses furnished those at the farm a succession of beautiful flowers with each new season. Waddington Farm became known the nation over for its splendor of equipment, the common sense and good taste which showed in its planning, the excellence of its farm products and blooded live stock.

Earl Oglebay died in 1926. In his will he left to the city of Wheeling his big estate, giving the city three years in which to decide to accept or reject the gift. There was little doubt, from the first, that the city would accept the magnificent bequest. But such an estate required a large annual budget for upkeep alone, and until July, 1928, when the city formally accepted the estate, the Wheeling Park Commission, already operating parks of 133 and 10 acres respectively, and other leading city agencies, were busy working out ways and means.

Rural-Urban Interests

In the meantime, Crispin Oglebay, nephew of E. W. Oglebay, became interested in showing the people what sort of program of public service could be operated with the park as headquarters. He called in the services of Dr. Nat T. Frame, Director of the Extension Division of West Virginia University. Dr. Frame, always anxious to line up the work of his division toward establishing better standards of living for rural dwellers, and a unity of thought and action between city and country, set to work, with Mr. Oglebay's assistance. Miss Betty Eckhardt, state recreation specialist of Dr. Frame's organization, headed a University staff which was established at the park. The staff included a recreation and dramatics advisor, a naturalist, a forester and a number of part-time workers.

With that nucleus, and the continued cooperation of the

THE FORMAL GARDEN BECOMES A THEATER
One of the recent occasions of its doing so was the production of an Anatole France play, a scene of which shown above

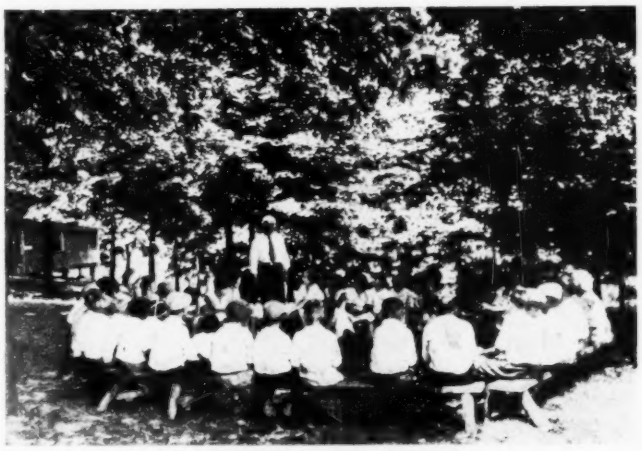
Country Estate the Citizens

By JOHN W. HANDLAN
Oglebay Park, Wheeling, W. Va.

OFF FOR A DAY ON THE NATURE TRAILS
It is such adventures that are giving Wheeling school children as a whole a new idea of education

city, through its Park Commission, the State University and the E. W. Oglebay estate and heirs, a program of unusual interest now functions at the hilltop park. This program retains the fundamental features of that started at the park before the city of Wheeling actually became its owner.

If John Smith wishes to take his family for a day in the country, Oglebay Park simplifies his problem considerably. There are 48 picnic sites in the heart of the park's woodlands, adjacent to its five miles of graveled auto roads and to tested spring-water supplies. If Mr. Smith wishes, he may telephone and reserve any of these picnic sites in advance. Arriving at the park, he finds tables, benches, an outdoor fireplace and firewood at his picnic place. If cooking is done, or if the wood is burned, he pays a nominal sum for the fuel. If his party does not burn wood, no fee is charged him. If he should find all 48 equipped picnic sites occupied when he arrives without a reservation, he is at liberty to picnic in any part of the park, although without the advantages of picnic equipment. The Smiths have enjoyed their picnic luncheon and look around for a way to spend the afternoon. An interesting hour is spent in the mansion-museum, beautiful former residence of the park's donor, now housing a collection of art and historical objects. From the mansion-museum the party moves to an interesting regional nature museum housed in another of the 32 buildings on the place. This nature museum is the hub of a series of nature trails, ten miles in length, divided into convenient strips of two miles. The mansion and the nature museum are on "The Hilltop" or central unit of the park acreage, and near both of them are the club-house and the conservatory and greenhouses, all open to public use.



STORIES IN THE WOODS
Wheeling playground children go to Nature to learn her enchanting secrets. At their own camp in the Park the naturalist aids them

Recreation

Public dancing occurs in the club-house ballroom three nights a week in summer and early fall, and the dance floor may be rented for private parties at any time other than public dance nights. Here, too, is a location for meetings, conventions, lectures and public gatherings of other kinds as well.

If any of the Smith family ride horseback for a hobby or are interested in learning to do so, the park riding academy will be certain to attract their attention before the day is over. Good mounts, capable instructors and more than ten miles of field and woodland bridlepath entirely off the automobile roads await their pleasure. Horses are rented by the hour. A nine-hole golf course and two tennis courts are available for the use of the visitors.

If the visit happens to be made on Saturday, the Smiths will stay for the free public lectures of Saturday nights during the summer.

Education

It is not at all unusual if the Smiths, by this time, are interested in learning more about what goes on in this park. They reach the office of the Oglebay Park camp and learn that a group of 75 men and women of college age are in camp, preparatory to the start of their three weeks' course at the park as students in the Oglebay Park Nature Training School. They have taken the places of two separate organizations in camp the week before—one a group of 30 business girls from Wheeling, and the other a group of 25 high school students from Ohio, West Virginia and Pennsylvania in camp for a Hi-Y conference.

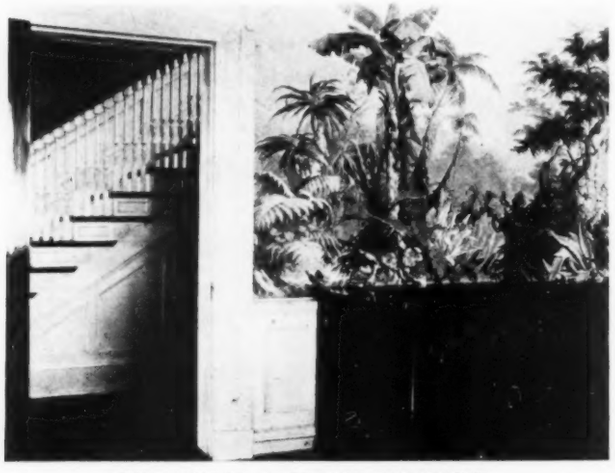
The Smiths learn that when organized groups have not filled the camp cottages and the fifteen floored tents available for campers, family groups are welcome to remain

THE CAMP DINING-HALL
Over 18,000 of the visitors to Oglebay Park during the summer of 1930 ate here

for periods ranging from a week-end to two weeks or longer. They decide to live in a tent for the week-end and arrive in camp Saturday afternoon. They are assigned blanket and bed linen, spotlessly clean, and are shown their tent and initiated into the use of the other camp facilities at their disposal. Their dinner is served in the big camp dining-hall—a well-cooked and well-balanced meal at low cost.

After a night's rest the group rise early Sunday morning and at 7 o'clock join more than 100 other people, campers and townspeople from many sections who have gathered for the regular Sunday morning "bird walk," a notable park institution. Breakfast on Sunday morning is served outdoors, cooked by the park crew. If the Smiths are lucky, their Sunday at the park will coincide with the appearance on the concert stage of the Wheeling Symphony Society orchestra of 85 pieces, a professional and amateur combination second to none, which appears every third week at the camp concert stage during the outdoor season. Sunday afternoons, between its appearances, professional bands give concerts at the park.

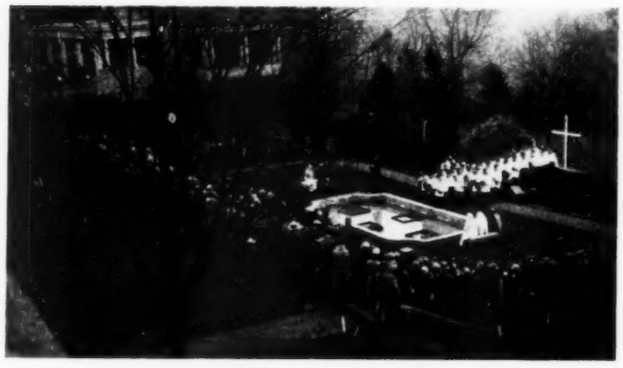
Perhaps the Smith family attended the church of their choice in the city only two miles away during the day, but if they didn't they are welcome to attend the non-sectarian vesper services at the park every Sunday night. These services are conducted in turn by pastors and laymen of all denominations in the district.



THE FAMOUS EL DORADO WALLPAPER
On the dining-room walls, in the Mansion-Museum, is the original Colonial wallpaper, a section of which is shown above

By this time the Smiths will have conceived a wholesome enthusiasm for the park program. They will discover that the organized camp groups are free to conduct their own programs with their own leaders, or, if they prefer, they can have the services of a camp director to plan and guide their whole camp program from setting-up exercises to camp fire council circles, of a song leader and coach in dramatics, of an art and handcraft instructor, of the park naturalist for field trips and lectures, and the assurance of good meals in the camp dining-hall.

The big camp unit central building once was a great dairy barn. The former hayloft, a huge assembly place, is the scene once a month of old-time square dances. The camp dining-room opens on a lobby where organizations have exhibits and where diners may await the sound of the dinner gong. Fifty Wheeling district organizations, including a half-dozen state conventions, met at the park in 1930 for banquets or business and social meetings. In one wing of the barn is the community workshop theater, a real Little Theater development under guidance of the park recreation advisor.



EASTER SUNRISE SERVICE
The formal garden provides an appropriate setting for this annual celebration

By as Well as *For*

All these park activities, the Smiths learn, are conducted with a direct contact with the Greater Wheeling public through a unique organization known as the Oglebay Park Activities Committee. This committee is made up of one member from each of more than 100 Wheeling district civic, women's, community or other clubs and is divided into sections of volunteer workers. A music committee supervises music programs, a dramatics committee looks after drama festivals, amateur operas and other features, a nature museum committee looks after the nature museum's problems, etc.

Oglebay Park has a staff on hand ready and eager to assist the public in anything from a corn roast at the park to an amateur dramatics performance in any community as well as at the park itself.

Certain special park programs have become community institutions. Among them the spring, summer and fall Sunday morning bird walks, the afternoon nature field trips of winter; an outdoor Easter sunrise service which last year attracted 1,500 people; a colorful community picnic and a memorial service on Decoration Day; and a gay Festival of Nations on July 4, are features of especial interest.

Centralia's Struggle for Municipal Power

THE experience of Centralia, a city of 8,000 people in the southwestern part of the state of Washington, in obtaining a plant for the generation of electric power, has been a continual conflict with natural, financial and legal obstacles. A modern hydroelectric plant has recently been placed in operation, but legal opposition is still a menace to the city's enterprise.

For over 30 years Centralia has had a municipally owned and operated electric distribution system by means of which the city has supplied lighting and power service to its inhabitants. The electrical energy for this purpose has been purchased from the Western Cross-Arm & Manufacturing Co., which has two small steam power-plants at Centralia. In 1928 the city authorities decided to undertake the generation of power by building a municipal hydro-electric plant, and filed applications at the state capitol for water rights on the Skookumchuck River. Later, however, the Nisqually River was determined upon as the site for a plant with an initial capacity of 11,000 hp., which could later be increased to 30,000 hp., the project to be financed partly by bonds and partly by cash. A bond issue of $650,000 was submitted to the voters and carried by a large majority, in the spring of 1929. Current funds supplied the remainder of the cost, which was estimated at $955,000, and will be about $1,000,000 when the last detail has been completed.

LOWER PORTION OF STEEL PENSTOCK
The Nisqually River is in the background and on its bank is the power-house to which the pen-stock delivers the water

FOREBAY AND SPILLWAY, CENTRALIA, WASH., HYDRO PLANT
Headgate at center above penstock intake

Construction was started and substantial progress made, when a suit to declare the election invalid because of insufficient legal notice was decided against the city by the Supreme Court of the state. Another election was held, in the autumn, and the city's program was overwhelmingly approved, whereupon a new suit was filed to restrain the city from proceeding with the project, on the ground that the ordinance under which the election had been held was illegal. Further obstructive litigation on the part of those opposed to the building of the plant included a motion for a permanent writ of prohibition to restrain the city from passing an ordinance to include the power project costs in the 1930 budget, and another motion to have the contracts approved at the two city elections declared invalid.

These efforts were finally defeated and the plant was finished; but the course of litigation is not yet run. A suit is now pending in the Federal Court at Tacoma, involving the city's rights, and, it is hoped, will be decided soon. The city wishes to condemn riparian water rights that the Puget Sound Power & Light Co. claims to own on the Nisqually River between the city's dam and its power-plant, and the company is trying to prevent this.

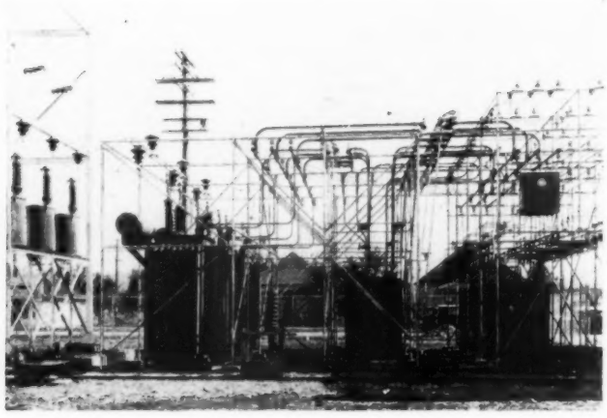
Construction of the Hydro-Electric Plant

By W. A. SCOTT

THE construction work for the recently finished municipal hydro-electric project of Centralia, Wash., was carried out under two general contracts, comprising the building of a timber-crib dam and intake structure on the Nisqually River, for the diversion of 600 second-feet of water; the excavation of a 9-mile power canal, a settling basin and forebay; the construction of a spillway, one penstock and power-house, the installation of two generating units, each of the capacity of 2,500 kva., and the construction of a 26-mile transmission line from the plant to the city, and a substation at the latter place.

General Contracts.—The first contract, for building the diversion dam and headworks, excavating the power canal, settling basin and forebay, was put through by E. F. Fisher, Los Banos, Calif., at $89,360. His work, completed about January 1, 1930, covered all phases of the canal work except the building of a semi-circular wood-stave flume across Yelm Creek.

The larger contract, awarded in May to the Puget Sound Bridge & Dredging Co., Seattle, at $447,538, was for the performance of all other construction and installation work required to complete the project. The contractor, in this case, furnished the materials and equipment, except hydraulic turbines and generators, and made all installations.



SWITCHING AND TRANSFORMER STATION, CENTRALIA, WASH.
The receiving-station of the 25-mile transmission line

The Power Canal.—The excavated canal begins at the lower end of the two concrete intake channels, below the diversion point, and extends 9 miles westerly, on the south side of the river, discharging into the forebay. On the upper section of the canal is a large excavated and dike-enclosed basin for settling the fine sand and silt. The canal has a bottom width of 12 to 16 feet, this variation being due to the difference in side slopes, which are 1½ to 1 and 1 to 1. The elevation of the canal bed at the intake is at 325 U.S.G.S. datum, and from that level it runs to the outlet on a gradient of about 3/10,000. The depth of water is close to 8 feet, with the canal carrying at full capacity.

While this channel was not concrete-lined, it required special sealing in some places along the line. There are two railroad under-crossings that required transition sections between the trapezoidal canal and the rectangular concrete structure below the track. The several crossings over highways are by means of wooden flumes supported on short steel spans.

Yelm Creek Flume.—The canal crossing over Yelm Creek, about two miles above the forebay, came under the contract of the Puget Sound Bridge & Dredging Co. This structure consists of a semi-circular wood-stave flume, 16 feet in diameter and 180 feet long. It was built of creosoted fir staves, 2½ inches thick, of an average length of 14 feet, and held in place by steel bands, spaced on 16-inch centers. The flume is supported by creosoted wooden cradles, 8 feet apart, resting upon concrete piers.

The Forebay.—The power canal discharges into a small basin, 95 feet by 70 feet, at the lower end of which is a 40-foot trash-rack section. The water flows through this into a converging channel that narrows to 16 feet and then opens into the main forebay. At this narrowest point it is proposed to install Taintor gates to control the inflow of water. The forebay, which is an excavated area having a concrete floor and sloping walls, is 250 feet long over-all with a maximum width of 70 feet. The spillway section, forming the north wall of the forebay, has an overflow crest 195 feet long. The spillway water falls into a concrete flume, 40 feet long, discharging thence into a wood flume, 680 feet long, that empties into the Nisqually River below the power-house.

Gatehouse and Penstock.—The reinforced concrete gatehouse, at the forebay outlet, is 12½ feet by 30 feet and 16 feet high. The 8-foot by 8-foot headgate installed is controlled from the power-house. In connection with the installation of one 7-foot diameter penstock, provision was made for placing a second one at some future time.

The mass-concrete intake section between the forebay and the penstock consists of an 8-foot-square opening which, in extending 18 feet, tapers to 7-foot circular diameter at the point where it connects with the steel penstock.

The penstock, 7 feet in diameter and 500 feet long, extends from El. 303 at the top to El. 116 at the Y, where it divides into two 60-inch diameter branches, each of which tapers to 48-inch diameter at the water-wheel. The penstock is supported on the slope of the bluff by concrete saddles, spaced 20 feet between centers. The lower 110-foot section was encased in a 12-inch sheath of concrete.

Generating Units.—The two Pelton horizontal water-wheels operate under an effective head of 205 feet. These drive two Westinghouse 2,500-kva., 2,400-volt generators at 530 r.p.m.

Power-House.—The power-house, of steel and concrete, is 51 feet by 48 feet, with a height of 65 feet above the water-wheel foundation. Outdoor switching stations were erected at the power-house and at the Centralia receiving station. A telephone line was installed along the canal between the diversion dam and the power-plant, as a part of the second contract.

Transmission Line.—Three Westinghouse transformers were installed for stepping-up the voltage to 66,000 for transmitting the power 25½ miles over a 3-conductor line to the substation at Centralia. The conductors are No. 0 copper wires, carried on cedar poles, with pin-type insulators. The poles were set in holes 6 to 9 feet deep. The first 30 inches of pole below ground level was treated with Anaconda wood preservative, applied in the form of a paste. The extreme butt end was similarly treated.

The Puget Sound Bridge Dredging Co., whose operations were in charge of O. I. Hall, construction manager, performed much of the work with its own forces, including the pouring of concrete for the forebay, spillway and flume, gatehouse and power-plant. The remainder was done under subcontracts by the following concerns: Federal Pipe & Tank Co., Seattle, the Yelm Creek flume; McBride Construction Co., Seattle, the excavating for penstock, power-house, and tailrace, all amounting to 15,000 yards; City Service Electrical Co., Seattle, the transmission line; Westinghouse Electrical & Manufacturing Co., the installation of all electrical equipment; Commercial Boiler Works, Seattle, the penstock; Lee-Nye Co., Centralia, building the Centralia substation; Judson Pacific Co., San Francisco, a 20-ton electric crane in power-house; Pacific Coast Cement Co., Seattle, the cement for concrete work.

Among the units of equipment used by contractors were Bucyrus 20-B ¾-yard power shovels, a Northwest 1½-yard dragline and a Rex concrete mixer.

The development of plans for the diversion dam, headworks and power canal was under direction of W. J. Roberts, Tacoma, as chief engineer. Those pertaining to the other features of the project that were made later, and engineering supervision, were in charge of N. W. Avery, City Engineer, and Burwell Bantz, assistant. The electrical installations were in charge of Glen Dunbar, with L. E. Kurtichanof, Portland, as consulting electrical engineer.

A Pioneer Smoke Department

WILLIAM G. CHRISTY, Mechanical Engineer of the Board of Education of St. Louis, has been appointed Engineer in charge of the newly organized Smoke Abatement Bureau of Hudson County, New Jersey, a new department of the County Board of Health. This is the first time in this country that a county has set up a smoke department.

This campaign will be conducted in cooperation with Stevens Institute of Technology, at Hoboken, where Colonel Elliott H. Whitlock, for the past six years Smoke Commissioner of Cleveland, Ohio, has been appointed to the chair of Smoke Abatement Research. Col. Whitlock will coordinate all smoke activities in various counties and municipalities of New York, New Jersey and Connecticut with the smoke abatement campaign in New York City.

Hudson County is appropriating $40,000 for the first year's work. Christy will have full charge of the campaign, the budget for 1931 providing also for a Deputy Engineer and six smoke inspectors. Hudson County comprises the territory across the Hudson River from New York City, and includes a total of fourteen municipalities.

Mr. Christy was active in the organization of the Citizens Smoke Abatement League and was for two years its Executive Secretary. He was responsible for bringing to St. Louis Dr. O. P. Hood, Chief Technologist of the U. S. Bureau of Mines, who formulated the plan under which the League operated.

Terminals for Seaplanes

AT PALM BEACH, FLA.
This simple ramp brings seaplane service to the heart of town

By **HOMER C. BENNETT**
Manager, Airport Section,
Aeronautical Chamber of Commerce of America, Inc.

AVIATION in America up to the present time has been built around the land plane. This was quite natural in view of the size of the continent and because of the governmental air mail program, which stimulated land plane flying almost exclusively. The land plane has also received the vast majority of attention from designers, probably due to over-optimism as to the extent to which private flying would develop, and to lack of familiarity with marine design on the part of most builders of aircraft.

Since the fall of 1929, careful thinking has brought to the fore the many advantages of the seaplane and the amphibian for aerial transportation along coast lines, over large bodies of water, and in lake and river regions. Sportsmen, too, are fast coming to realize that planes capable of landing on water are unexcelled as delightful means of getting about.

Practically every major city of America is situated on navigable water. This means, provided adequate landing facilities are available, that seaplanes can be brought to the heart of these cities. It eliminates long rides to and from airports, which are almost invariably located well out of the city. It gives to the air traveler the full value of air transportation.

Providing Landing Areas

The genius of many of America's finest aircraft designers is now being applied to the development of flying boats. Large corporations are backing this research which insures development of many types of watercraft. At the same time international flying is rapidly coming to be recognized as a commercial venture with great possibilities. The time has arrived when forward-looking cities should plan adequate terminals for seaplanes and amphibians.

The first requirement for a seaplane

SEAPLANE RAMP AT MUSKEGON, MICH.
A typical, inexpensive terminal close to town. Suitable for use where tides are absent

A COMBINATION LAND AND SEAPORT
The seaplane ramp of this development, which is owned by the Curtiss-Wright Airport Corporation, is at the extreme right

Wide World Photo

HANDLING A SEAPLANE ASHORE

Capt. Lewis Yancey's plane, "Pilot," which was flown from Bermuda to New York, being maneuvered on its beaching wheels

base is a sufficient expanse of protected water to allow safe take-offs of large seaplanes and flying boats. While a seaplane can alight in a shorter distance than can a land plane, it requires correspondingly more space for take-off. Accordingly, the water area should be sufficiently large to allow a run of 4,000 to 4,500 feet into the prevailing wind. The depth of water at low tides should be at least five or six feet. This depth is important to prevent planes drawing around three feet of water from going aground when a rough or choppy sea is running.

The area need not be kept entirely free from surface traffic. An ordinary amount of ship movement is not a handicap or hazard. Large numbers of small boats, however, should not be allowed to congregate or use the landing area.

The nature of the shore surrounding the landing area is important. As seaplanes generally do not climb as rapidly as land planes, obstructions should not exceed in height a ratio of 1 to 10 in relation to their distance from the take-off area.

Anchorage

An anchorage area should be set aside for exclusive use of planes. This area should be adjacent to the terminal if space allows. If not, it should be located as conveniently as possible to the terminal. An anchorage of fair size, close to the terminal, reduces the necessary dimensions of ground area on which to store and repair planes. By the utilization of a float or ship's life raft, practically all fueling, ordinary repairs and inspections can be done while the plane is at anchor. This obviates much of the need for taking it out of the water.

A reasonable number of mooring buoys should be maintained in the anchorage. In order that planes may not be damaged by ramming these buoys, they should preferably be made of cork with their anchor chains or cables running through their centers. Mushroom anchors or blocks of concrete used for moorings should ordinarily weigh 500 pounds. The Department of Commerce in its requirements for "A" rating specifies at least one mooring capable of withstanding a 4,000-pound pull. They consider a 1,000-pound concrete block and $\frac{3}{8}$-inch bronze cable satisfactory for this purpose.

It is of course highly desirable that this anchorage area be a stretch of water well protected from storms and high winds. If a natural basin is not available, oftentimes an equally good area can be obtained at small cost by building a seawall to enclose an otherwise unprotected site.

Requirements for Terminals

Conditions vary to such a marked degree from city to city that it is impossible to set up any one group of requirements for a satisfactory terminal. In many large cities it will be possible to develop excellent passenger loading facilities near the center of activity, but entirely out of the question to establish hangars, repair shops and anchorage at the same site. Thus, it may be necessary to establish two bases: one, a downtown terminal for loading and unloading only; the other a seaplane airport with the usual hangars, repair facilities, etc. The location of the latter type of base will be determined by real estate values as well as water facilities from which to take-off. As most coastal cities are fog-bound part of the time, it is well in locating such a sea airport to select a site outside the major fog area if possible. Thus, air transport operations ordinarily starting from the downtown terminal can maintain schedules when this terminal is fog-bound by using motor boats to carry passengers and cargo to the sea airport.

A SPORT SEAPLANE TAKING OFF

The photograph was taken just before the pilot put the plane "on the step" prior to leaving the water

A second major variable which prevents general use of any one type of terminal is the difference in depth of water at sites where terminals are feasible. The only economical deep-water terminal is a floating one. This is particularly true along seacoasts where tides are encountered. Permanent ramps built up from the bottom are likely to be the most satisfactory if the terminal is on shallow water where no tide or only small tides are encountered.

Deep-Water Terminals

In order to take advantage of a location near the heart of the business district in the larger cities, it is necessary to use some type of floating terminal. Ordinarily the available water frontage is occupied by piers or commercial bulkheads. In practically every city in the United States, however, it is possible to find a pier or bit of bulkhead space that can be made available for seaplane and amphibian landings without in any way seriously changing the existing water-craft arrangements. One hundred feet of actual bulkhead or pier space is more than enough for an excellent base.

In San Francisco, Air Ferries, Ltd., has developed an excellent terminal at the end of Pier 5, but a few steps from the Ferry Building. A semi-circular floating island 97½ feet in width is anchored off the end of the pier. This float was specially constructed for the use of amphibians,

but can be easily adapted for seaplanes. The deck resembles in shape a large mushroom, its smooth, rounded top sloping into the water on a 180-degree arc. The internal construction is on the cantilever principle. Buoyancy is obtained by pontoons with water-ballast tanks to control the trim. The entire float weighs about 100 tons.

Passenger waiting-rooms, ticket offices, etc., are located on the pier, from which an ordinary gangplank allows access to the float. The amphibians used by Air Ferries land in the bay, taxi to the float, lower their wheels and roll up on the float under their own power. Thus passengers and cargo can be taken aboard while the plane is on a solid foundation. It takes about three minutes for the plane to land, load, and get back into the water from this terminal. Many types of seaplanes could use this terminal, as they can be slid up the incline on their keels or pontoons a sufficient distance to allow passengers to disembark.

Where dock or shore space is not available for construction of waiting-rooms, ticket offices, etc., a little ingenuity can develop a terminal entirely afloat. Oftentimes the best site for flying operations along a city's waterfront is in a park district. Quite rightly, the city hesitates to use such property for building air terminals. Also, in some commercial areas where bulkhead space is available the upland is entirely occupied by streets or buildings. In both these cases a highly satisfactory terminal can be built by utilizing a car float.

Railroads terminating at harbor cities almost invariably have to ferry freight cars. The car ferries or floats which are used for this purpose can often be bought after they have completed their usefulness in ferrying service. A competent marine engineer can convert such a float into an air terminal of high efficiency. As a general thing, these floats are from 30 to 40 feet wide and about 250 feet long.

Ramps can be constructed at one end and a terminal building to house waiting-rooms, offices, restaurant, etc., built at the other. The float is then anchored just off the bulkhead, with the deck house in-shore. A gangplank from the barge to the shore completes the terminal without encroaching upon the land at all.

In such a terminal the proper design of ramps is important. A constant slope must be maintained and sufficient strength built in to carry the weight of large flying boats. A New York engineer has a design which utilizes captive, submerged pontoons for supporting the ramps. This plan eliminates the tipping of the float when a heavy weight is placed on the end of one of the side ramps. It also makes possible at little cost a terminal usable equally by amphibians, seaplanes and flying boats. Ramps on each side of the float can be used by amphibians, and a third ramp from the outboard end can be rigged with a movable platform for hauling seaplanes and boats from the water.

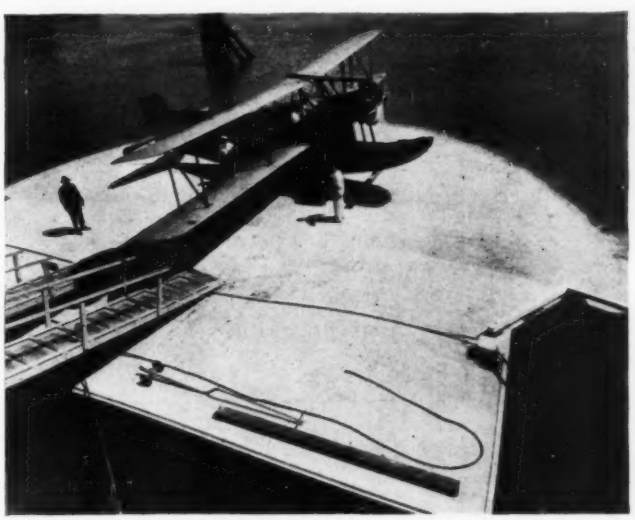
Terminals built up from car floats in this manner can be made extremely attractive and complete. The deck-house can be built with an observation roof with tea tables or restaurant facilities. The size of the barge allows ample space amidships for the service equipment necessary at the terminal.

Seaplane Airports

The building of a seaplane airport involves much the same general equipment as a land base so far as buildings, repair facilities, lights, etc., are concerned. It differs chiefly in that means must be provided to take planes out of the water and move them about while on land. A ramp with a slope of about 1 to 10 which extends at least four feet below mean low water is a simple construction job for a marine contractor. The chief things to be sure about in building such a ramp are that it is wide enough (under no circumstances less than 30 feet, preferably 100 feet), and that it is built sufficiently strong to stand any normally bad weather to which it may be subjected. In northern localities where heavy ice must be expected, a solid concrete ramp like that projected at Buffalo is highly desirable. In less severe climates wooden ramps built up on piling are just as good.

The most satisfactory method of getting seaplanes and flying boats out of the water is to provide live platforms or cradles which can be run down the ramp and under the plane. A rubber tread tractor is the best motive power for pulling them up the ramp. However, many types of seaplanes can be blown by their own power far enough up a ramp for loading or discharging passengers.

This entire subject of seaplane bases and terminals is not complicated. An intelligent seaplane pilot in collaboration with a competent marine engineer can work out practically any unusual features made necessary by local conditions. From the point of view of cost, seaplane terminals obviously are less expensive to build than the average land port. Their potential value to cities so situated as to utilize seaplane and amphibian service should encourage the construction of many during 1931.



DEEP-WATER "BUTTON AIRPORT"
The floating terminal belongs to Air Ferries, Ltd. It is at the end of Pier 5, San Francisco. It makes possible rapid handling of passengers and cargo

A GENERAL VIEW OF THE HAMILTON SEWAGE TREATMENT PLANT

Sewer System and Disposal Plant at Hamilton, N. Y.

Novel Sludge-Removal Method and Heated Sludge Digestion

By HENRY W. TAYLOR
Consulting Engineer, New York City

THE sewerage system recently installed in Hamilton, N. Y., warrants consideration, not because of its magnitude, but because it is representative of numerous sewerage installations required throughout the country. The population of Hamilton is purely residential, and includes the students and faculty of Colgate University.

A water system was installed in Hamilton some thirty years ago, and, owing to the existence of a sandy soil in most sections, drainage had been taken care of with some success by cesspools and septic tanks. There are, however, certain low sections where such disposal of drainage is difficult, and there are others where the character of the soil includes more clay than sand, and cloggage of cesspools has resulted. In the business and fraternity house sections, undesirable sanitary conditions required correction.

Unsanitary Conditions Corrected

Early in 1913, the sanitary drainage situation demanded the attention of the Board of Trustees, and plans were prepared for a sewerage system and sewage treatment works. For the next fifteen years the matter of sewers was frequently discussed, but no definite action was taken until 1928, when the writer was ordered to review the situation and make the necessary revisions in the original plans. Because of a different theory of sewerage design, this review developed into a re-design of both the sewers and the sewage disposal plant. In 1929, contracts were let for the construction of the sewer system and sewage disposal plant, and the installation has been in operation for the last several months.

Construction of Sewers

There are no special factors in the design of the sewer system which need be mentioned here, except that as the sewer construction developed, a considerable amount of ground water was encountered in lower areas and underdrains were installed, both to protect the sanitary sewer and to lower the ground-water table in these areas and produce an additional benefit to the population there. The contract was framed so that the installation of underdrains below the sanitary sewer could be ordered on the basis of unit prices in the contract. In one case, an underdrain was ordered for construction purposes only, and the discharge of the underdrain was pumped from the mouth of the drain. This section of sanitary sewer has proved to be practically watertight against ground-water infiltration, and the engineer was satisfied that such a result could not be obtained with spot pumping. The result of construction has completely warranted the use of the underdrain for temporary purposes only, since the sewage in question is pumped twice.

THE COVERED SPRINKLING FILTER INSTALLATION

In another section of sewer, a 6-inch underdrain was installed for about 1,000 feet, when sufficient ground water was encountered to surcharge the underdrain originally planned. It happened that there was a sewer to be laid on the opposite side of the highway, and in order to relieve the surcharge of the original underdrain, a second and larger drain was installed under the parallel sanitary sewer at greater depth. The ground-water table

was dropped over three feet and is being maintained at this level or better; and the sanitary sewers are about 12 inches above the water-level and the cellars in this vicinity have been completely relieved of periodic dampness and floodage which occurred in the past.

The total cost of the underdrains amounted to about $13,000. Operation of the system has justified this investment, for the following reasons. The infiltration into 40,000 feet of sewer piping is practically nil; all sewer sizes have been protected against surcharge; the pumping plants are not handling ground water; the disposal plant is not loaded down with diluting water from the ground; ground-water tables have been lowered and are being maintained at lower levels; construction of sewers was accomplished under dry conditions, with dry beds or gravel cradle with underdrains beneath, and will therefore be more permanent and in better alignment; infiltration is both avoided and prevented.

As a further precaution against ground-water infiltration, cast iron pipe was used for one of the trunk sewers, in the vicinity of a surface-water stream. Subsequently, and by means of another contract, this stream was dredged to a lower depth, removing the probability of infiltration, but the cast iron pipe was still necessary from a structural point of view, because of the poor bearing values. Each length of Universal pipe was supported by two piles with cross-head in order to protect both initial and permanent alignment.

Small Automatic Pumping Station

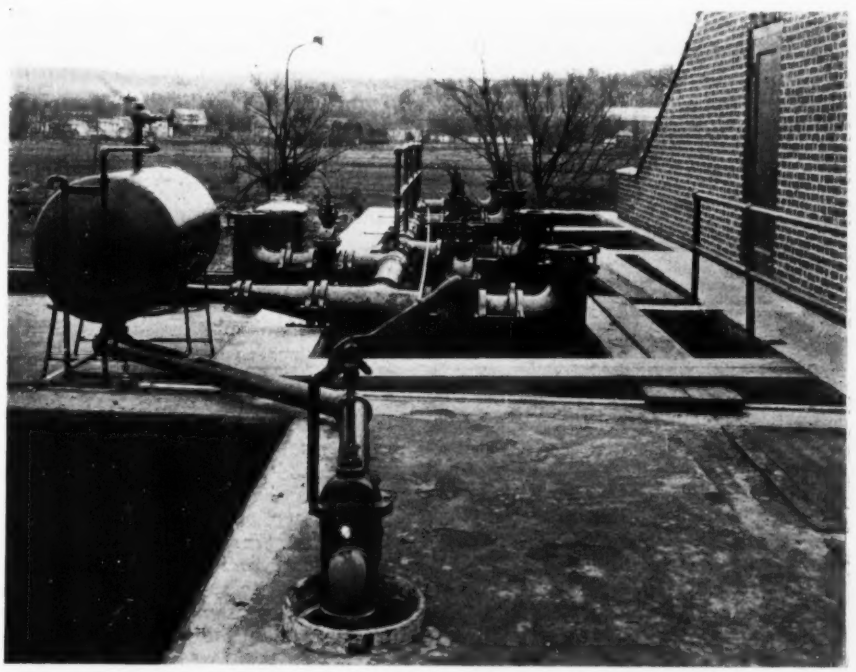
A portion of the eastern section of the village necessarily drains to a low point, which, without pumpage, would necessitate lowering one trunk sewer about four feet. Such a design would have brought a long length of trunk sewer considerably below known water tables. The extra excavation, difficulty with water, and danger of large infiltration, forced the decision to install a small automatic pumping station, to lift the drainage from this area into a gravity trunk line laid at a higher level. The construction and operation of the plant has proved the advisability of this decision, and as the power for this pumping station is supplied from the municipal plant, the capitalized pumping charges will not, by a large margin, approximate the increased cost of construction for a trunk sewer at a lower level.

Sewage Disposal Plant

Two trunk sewers meet at the disposal plant, and this plant consists of a pumping station for all the sewage, two preliminary settling tanks, a sludge digestion tank with floating cover, a sprinkling filter with a Barns glass cover, open final settling tank, sludge beds and a short submerged outfall sewer. The pumping station is of standard design, with three Fairbanks-Morse units installed, but for the present one unit carries the load by intermittent operation. These reserve units are, however, of considerable value, in that if the power service is interrupted, there still remain two units which were not on the line at the time of interruption, and they would be thrown on the line by their float relays when current is returned to the circuit. The operating pump would of course remain dead on account of its low voltage release, while the two remaining pumps serve, one for operation and one for peak load or reserve.

The pumps lift the sewage from a 12-foot cut at the pumping station to the settling tanks through submerged inlets. Each tank has two steep hopper bottoms, the slope being two vertical to one horizontal, and these tanks were coated with Inertol paint for waterproofing and to encourage sliding of the sludge. The two tanks are ordinarily used in series, but the pump discharge lines are so arranged that either one of the tanks can be used separately while the other is being cleaned. The effluent from the tanks is collected by submerged piping and extended to the dosing tank. A removable screen is provided in the dosing tank, and the effluent from the settling tanks passes over this horizontal screen and drops to the dosing tank water surface. The screen protects the Pacific Flush-Tank sprinkler nozzles from clogging and also provides a preliminary aeration. A 10-inch dosing siphon discharges the tank effluent to the sprinkling filter. The main header and laterals of the sprinkling filter consist of 10- and 6-inch Universal piping laid just beneath the surface. The sprinkling filter contains 8 feet of fairly large stone, since the requirements of the purification did not include great clarity of effluent. The underdrains of the sprinkling filter consist of a simple system of channel pipe laid on sloped concrete floors, and the main underdrains are concrete gutters in this floor. The filter is covered with an all-steel truss and purlin glass roof, and the gable at one end of the filter is built of terra cotta block so that the filter can be extended when its capacity is reached.

The gas from sludge digestion is collected in the dome of the Downes floating cover and is burned in a B-line heater. A supply of compressed gas is maintained outside the pumping station as an auxiliary and to produce the initial heat in the sludge tank. The sludge tank is heated



THE SLUDGE REMOVAL APPARATUS AT THE HAMILTON SEWAGE TREATMENT PLANT

by a system of wall radiators hung in the central portion of the tank.

Sludge Removal

A new system of sludge removal was utilized in this plant, and the apparatus involved in this new method of sludge removal is shown in the third illustration. In desludging settling tanks of a system serving less than 10,000 people, the writer has encountered great difficulty in the hand operation of 8-inch sludge valves when blowing off sludge pockets. The time required to open the valve and immediately close it, produces a flow of a quantity and suddenness to disturb the sludge pocket and carry with the sludge a large amount of water which is not wanted. In the case of the Hamilton plant, if the sludge pockets are properly cleared of deposited sludge each day, or every other day, the amount of sludge in each pocket would represent less than one cubic yard of wet sludge. To remove this amount, and no more, by means of an 8-inch valve, is practically impossible, and to overcome these mechanical difficulties, a new system of sludge removal was adopted.

There are four pockets in the two tanks, and each one of these pockets is provided with a sludge riser extending to the top of the tank, and a lateral connection is made to these risers from a sludge header running along the top of the wall of the settling tank. This sludge header is connected into the top of the steel tank shown in the photograph. An outlet from the bottom of the tank drains the tank to the sludge digestion tank. By means of a vacuum pump located in the pumping station, the steel tank is put under negative pressure, and the sludge from one of the pockets is drawn up through the header and into the top of the steel tank. The vacuum pipe is controlled by a ¾-inch valve, and the rate at which the sludge is drawn from the sludge pocket, through the riser and header and to the steel tank, can be readily adjusted by this ¾-inch valve to any desired speed. The tank holds about ¾ of a yard, and it is impossible for the operator, in one operation, to remove more than ¾ of a yard from the pocket to which he is devoting his attention. When the steel tank is full of sludge, the vacuum valve is closed, and a 1½-inch valve is opened to the atmosphere, and the discharge valve from the steel tank is opened and the contents drained to the sludge tank. The operation of this method of sludge removal has proved to be very satisfactory, in the removal of deposited sludge and no more, in the small disturbance created during the operation of removal, and in the ease of control.

Costs

The total cost of the sewerage system, including some 42,000 feet of sewer piping, about 9,000 feet of underdrain, together with the complete disposal plant, land, engineering, and legal expenses, amounted to $157,000. The original contract was bid in at a low figure by DeLuca Brothers, of Utica, N. Y., so that for the engineer's original estimate of $157,000, some $35,000 of additional work could be done, without exceeding the appropriated funds. This extra work included underdrainage, additional sewers, additional manholes, a second sludge bed, a third pumping unit, and miscellaneous improvements to the original layout, which were of considerable value in ease of operation and permanency of construction and capacity.

Unemployment Relief and Long-Time Recreation Planning

AN immediate program for utilizing publicly owned land for recreation purposes, to meet recreation needs and aid the unemployment situation in New York City, is urged by Thomas Adams. A guest of honor and chief speaker at the recent annual luncheon meeting of the New York City Recreation Committee, Mr. Adams discussed by request the new official city-wide plan for parks, parkways and playgrounds, and methods looking to its realization in the best and most expeditious manner. He heartily endorsed the progress made in recreation planning by New York under the present administration, and stressed the expediency of immediate action in the carrying-out of the present program of open-space acquisition and development. "There is no way," he said, "in which public money can be spent to better advantage while the present depression—due to economic readjustment—continues, than in going ahead immediately with such work.

"In addition to its fine program of purchase, the city should develop a program of dedication for recreation purposes of land which it already owns, notably the East River Islands, which should in large part be devoted to recreation. They lie near to crowded sections of the city, they are ideal from the standpoint of safety and openness, and, belonging to the city, can be apportioned as the city desires. All the land in the central areas that the city is likely to purchase will not be adequate for recreation purposes. This makes the reservation of areas for recreation on Blackwell's, Randall's and Ward's Islands of vital importance. *It would be a significant social tendency to replace penitentiaries and asylums with playgrounds:* an expression of faith that prevention is better than cure. Further, it would be a practical opportunity to help the unemployed without having to wait."

Two other points stressed by Mr. Adams, which, like the first, are capable of wide and general application, are: (1) that the well-organized park and playground plan as presented cannot be expected to function satisfactorily unless developed in connection with a comprehensive city plan; and (2) that large cities cannot hope to develop systems of public open areas to keep pace with developing demands unless new requirements are made of building operators in the matter of open spaces around residences in congested areas. Front yards, side yards and back yards should be required by law.

"All that the Regional Plan of New York has done, and all that the well-organized park and playground plan as presented by Comptroller Berry has done, are only beginnings in a really intelligent treatment of the problem. There are about 1,100,000 children between the ages of 5 and 14 in the city. *A sound system of distribution* of open spaces to meet the requirements of these children cannot be obtained unless the system is coordinated with a comprehensive plan for all physical features. But it is not enough for a city to buy parks and playgrounds in open situations. Interiors of blocks should be bought and cleared of buildings, leaving private owners to build on the portions facing on streets, and providing enclosed, interior, safety playgrounds.

"More restrictions of building density should be applied to zoning to secure yard space around dwellings. The fact that the more public open spaces are some distance from the crowded parts of the city, makes it all the more important that more yard space should be provided in crowded areas as they are rebuilt. Small interior playgrounds require special supervision, but this fact is no reason why they should not be provided. They are not substitutes for open public playgrounds, but are necessary as a part of the system of providing space immediately adjacent to the home, and air and light in the house."

ST. PAUL'S RIVERFRONT FROM THE RIVER

One City's Back Yard Is Transformed Into Its Front Yard

By **GEORGE H. HERROLD**
City Planning Engineer, St. Paul, Minn.

ST. PAUL is about to realize a vision it has had for many years of the transformation of a run-down riverfront section into a civic esplanade. This esplanade will lie directly opposite the city's retail business district. At its western end and facing on it will be the new City Hall and County Building, and at the eastern end and facing it, the new United States Post Office. The cost of property acquisition for the improvement was $1,560,495, of which $598,450 was assessed against benefited downtown property.

The Street in Retrospect

In early days Third Street was the leading retail street, with business houses on each side. It was about 45 feet wide. In 1872 the street was widened by removing the porches, which were then a necessary architectural adornment of any frontier town store. This widened the street to from 53 feet to 57 feet and it then became a flourishing thoroughfare. In the meantime railroads were being built and river navigation was fading away. Third Street, which opened out on the levee or steamboat landing, lost its prestige. Business began to develop at right angles to Third Street along Robert and Wabasha Streets.

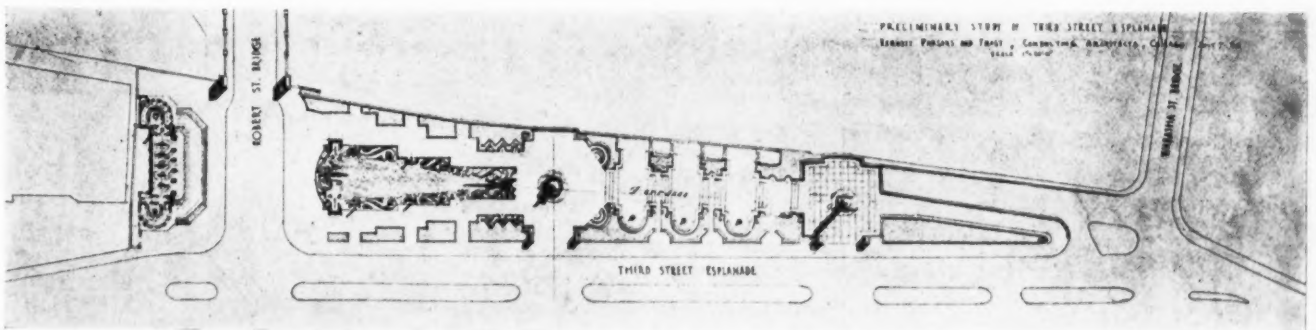
THE DEMOLITION OF THIRD STREET IN PROGRESS

Widespread public interest was first manifested in the project in 1927, when the City Council passed a preliminary order for widening Third Street to 90 feet in order that it might serve as a marginal thoroughfare street and a distributor of traffic to the north-and-south retail streets. There was an immediate demand for clearing off all buildings on Third Street from St. Peter Street to 100 feet below Robert Street, a distance of 4½ blocks, and connecting it on both east and west with an 86-foot street and a 56-foot roadway easily accessible from several state trunk highways. The final order for this improvement was carried out in 1929.

The clearing-off of all the buildings on the water side of Third Street was recommended by John Nolen in his plan for the downtown business district in 1911.

The Bennett & Parsons plan of 1921 recommended opening up vistas at the bridge heads at Wabasha Street by removing the block of buildings on either side and creating a large plaza at Third and Robert Streets for the bridge head of the Robert Street bridge over the Mississippi.

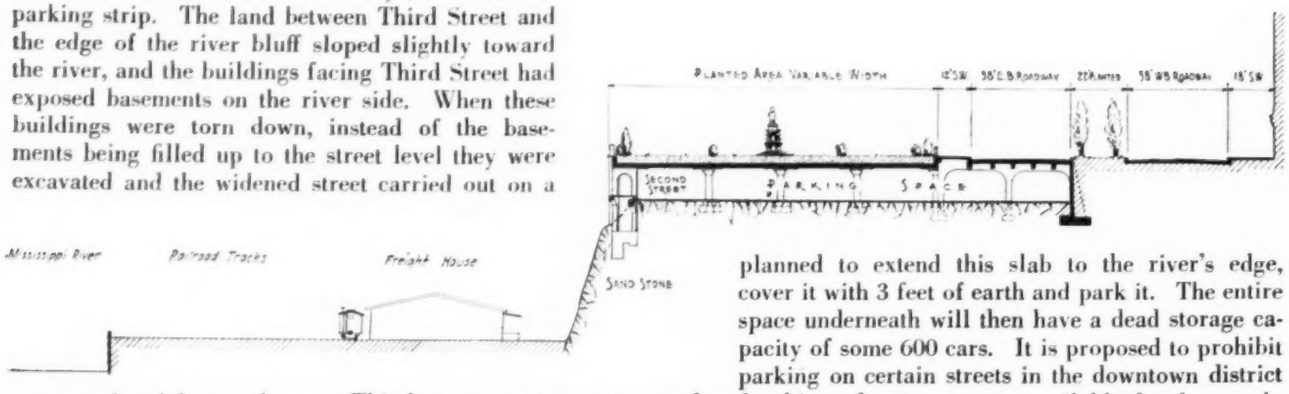
The completed street has a cross-section of 18-38-22-38-



PRELIMINARY PLAN FOR THE ESPLANADE AND PARTERRE, ST. PAUL

The esplanade, 128 feet wide, has been completed, in accordance with the Bennett, Parsons and Frost design. Detail plans for the parterre are now being prepared by William N. Carey, Chief Engineer, and Charles Bassford, City Architect

12 for sidewalk, double driveways, and central parking strip. The land between Third Street and the edge of the river bluff sloped slightly toward the river, and the buildings facing Third Street had exposed basements on the river side. When these buildings were torn down, instead of the basements being filled up to the street level they were excavated and the widened street carried out on a



concrete flat slab on columns. This leaves an open space underneath the new roadway for parking cars. It is planned to extend this slab to the river's edge, cover it with 3 feet of earth and park it. The entire space underneath will then have a dead storage capacity of some 600 cars. It is proposed to prohibit parking on certain streets in the downtown district and make this under-cover space available for free parking not to exceed two hours, in lieu of street parking.

Mixed-in-Place Highway Resurfacing

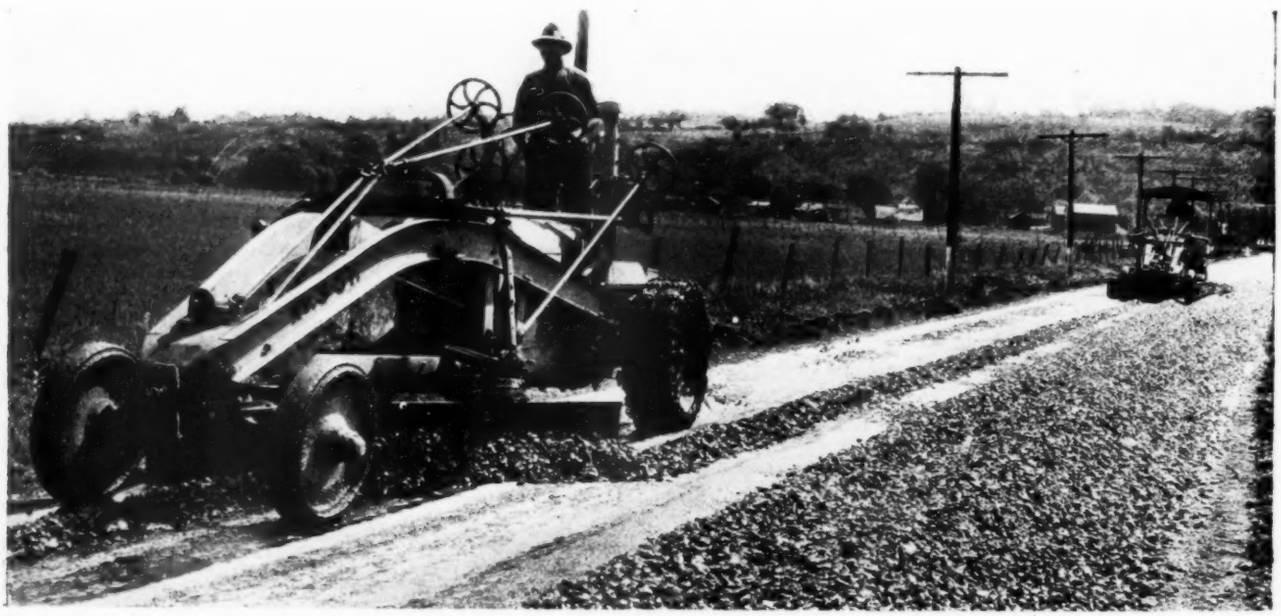
By **D. J. FITZGERALD**
Chief of Highway Maintenance Division No. 3, New York State Department of Public Works

THE mixed-in-place method of bituminous resurfacing of highways is a recent development of road maintenance. The procedure followed on the eight miles of the Mycene-Manlius Center-East Syracuse Highway No. 555 is typical of this method.

This highway was of bituminous macadam, 14 feet wide, which had worn to a rough and wavy surface. The resurfacing widened the traveled way to 18 feet and restored the desired crown and smoothness with two inches of durable tread.

As shown in the picture, earth shoulders were first thrown up, and then over the untreated old surface 1½ inches of limestone was spread from trucks. This spreading covered about two-thirds of the desired finished width and was controlled to furnish sufficient stone for the desired completed depth and width. On this job the stone was washed before delivery and allowed to dry before treatment. The thickness of the spread of the loose stone at this stage of the work was about 6 inches.

Heated bituminous material of the specified penetration



Photograph by Jasper T. Crawford
TWO GRADERS COMPLETING THE FIRST TURNOVER OF THE 1½-INCH LIMESTONE, TO WHICH 0.4-GALLON OF BITUMINOUS MATERIAL HAD BEEN APPLIED

was then spread from pressure-tank trucks in sufficient amount to give 0.4-gallon per square yard of completed road.

Mixing

The mixing was done entirely with graders. First, the coated stone was rolled into a windrow to one side of the road. A properly curved moldboard on the grader is an important factor to give both a roll and a push to the coated aggregate. The picture shows the graders just finishing the first throw-over. The stone is about half coated.

From this pile the graders worked the stone to another windrow on the other side of the road. This was continued for three or four throws, and the mix was then spread to its original 6-inch thickness for the second application of bituminous material.

The next coat was of slightly heavier binder and was applied at the rate of about 0.5-gallon per square yard of completed road. Again, the graders mixed the stone and binder, following the same routine as for the first coat. Three or four cuts finished the coating. In case the work was stopped by weather or end of work day, the mix was left in a windrow. This minimized setting and allowed easier manipulation when the work was resumed.

Final Spreading

Final spreading was done entirely with the graders. To get a smooth job, a machine with a long wheelbase and a skilled operator was an advantage. From the piled stone a slice was shaved and pushed near the opposite shoulder in a windrow. The next cut placed a piled row near the center of the road. This left part of the stone for the third strip. Judgment on the part of the operator and engineers determined the amount and spacing of these spreads.

The blade then cut off the tops of these rows into the valleys between for the final surface of the coarse aggregate, and a 7-ton roller rolled from the edges toward the center. A surprisingly uniform surface resulted. Where dips showed up under the roller, loose coated stone was placed and rolled in to bring up to grade.

Next, chink stone was applied in sufficient amount to fill all voids. After rolling, a rotary broom swept off the excess chink stone and cleaned the surface for the seal coat. This final application is put on at the rate of 0.3-gallon per square yard, followed by the top coat of ¾-inch stone spread, broomed and rolled. This completed the process.

Test borings in the completed section showed the coarse aggregate completely coated and locked in place to the desired thickness. In good weather one mile per week is completed at a cost of about $5,000 per mile, or about 50 per cent of the cost of other methods of resurfacing.

This method has been in use in the division for nearly two years with excellent results. In 1930 there were sixty miles of old roads so treated in this section.

This method was developed through the cooperation of the Barrett Company and highway engineers. A binder called Tarvia Re-Tread has been designed for this special process. It was used on this job, the work being done entirely by the state maintenance crew.

Establishing Playground Attendance Measurements

By **GEORGE S. HARMAN**
Statistician, Playground Commission, City and County of San Francisco

IN THE AMERICAN CITY of August, 1930, there appeared a short article headed "Recording Recreation Attendance." In this article Richard Hayden, of Rutland, Vt., states the necessity of a standard unit of attendance on playgrounds, and a standard method of recording that unit, so that a comparison of attendance and per capita costs may be made for the various systems throughout the country.

The San Francisco Playground Commission has had a system incorporating Mr. Hayden's general ideas in force for the past two years.

After a great deal of thought and study it was decided by this department that a fair unit for attendance would consist of a visit to a playground by a person, the visit to last theoretically two to three hours. During school vacations and on holidays our playgrounds open at 10 A. M. and close at dusk, with the exception of those playgrounds equipped for night work, which remain open until 9, if warranted by the attendance. During school days the playgrounds open at 12 M. and close as above stated.

In order that the use of this unit might be uniform, instructions were issued to all grounds. A portion of the notice reads as follows:

"The playground day is divided into four parts, the morning from 10 to 12, the afternoon from 12 to 3 and 3 to 6, and the evening from 6 to close. Whenever the playground is officially open during any one or portion of one of these periods, one count shall be taken at the time that the largest attendance is present during that period, and a record made of it immediately in the proper space on the weekly attendance report. In other words, there will be one count in the morning, two in the afternoon, and one in the evening."

By rigidly enforcing the use of this unit and the rules and regulations governing the recording of attendance, the department has been able to make per capita cost studies for the various playgrounds, and accurately show just how each playground produces in comparison to money spent. Inasmuch as the department has a definite unit, it can fairly accurately compute the amount of hours that people spend on the grounds, assuming an average of two and one-half hours per person.

Before this system was designed, a study of systems in other cities was made. Several good ideas were obtained in this way, but it was also noted that every city had a different idea in the matter of taking and recording attendance.

The department does not believe in adding a percentage to the attendance figures, because that tends to make merely an estimate. It is not definitely known whether five, ten, or fifteen per cent should be added; therefore, why destroy a definite figure by adding a purely assumed quantity?

Recreation people throughout the country have discussed the attendance problem at great length, but thus far have taken no definite action. The San Francisco Playground Commission feels that although this system may not be correct in detail, it is fundamentally correct in practice and established on a firm foundation because it is based on a definite unit.

THE HALIFAX CIVIC HEALTH CENTER

This view was taken from the tower of the main Dalhousie Medical School Building. Its shadow points to the Carnegie-Rockefeller Clinic and Dispensary in the immediate foreground. Beyond and opposite are the hospitals, nurses' home, etc.

A Civic Center Devoted to Public Health

How Halifax, Nova Scotia, Turned a Catastrophe Into a Clinic Which Treats 15,000 Patients a Year

By **NATHANIEL S. OLDS**
Planning Foundation of America

HALIFAX, Nova Scotia, has established in cooperation with Dalhousie University a Civic Center devoted solely to public health. On a hill overlooking the harbor and the wooded ridges which surround the provincial capital, are grouped five major hospitals, a public clinic and dispensary, and the Dalhousie Medical School. Beyond the Civic Health Center the fine arts buildings of Dalhousie rise on the slope of another hill. They are designed in the Georgian style and built of the local gray stone of the province. The location lends itself to unit treatment, and plans are now under way to join the groups by a broad avenue. The approach will be parked and planted and will connect the business center of the city with the beautiful northwest arm of the harbor.

The history of the Halifax Civic Center presents to readers of THE AMERICAN CITY an interesting commentary. The fortunes of war not only set the stage for Dalhousie University and for the Health Center, but produced the funds which made their erection possible. Massachusetts in each instance played the part of ministering angel. On the first occasion her contribution was made at the point of the bayonet. In the second instance the Commonwealth gave to Halifax her money and her assistance with a generosity that the Nova Scotian city remembers with deep gratitude.

Funds from Foe and Friend

Almost exactly one hundred years separated the two events. In the war of 1812, Sir John Sherbrooke, the Lieutenant-Governor of Nova Scotia, captured Castine, a Maine seaport then in the province of Massachusetts, and appropriated the custom receipts. In 1818, his successor, the Earl of Dalhousie, set aside from this trophy of war £9,750—about $75,000 at present valuation—to found the college which bears his name.

The second advent of Massachusetts on the scene occurred in 1917. In that year the explosion of a T.N.T. ammunition ship in Halifax harbor annihilated part of the city and paralyzed the rest. Boston, aided by the state, contributed $750,000 in cash, rushed-in medical supplies, food, clothing, and even furniture, together with staffs of doctors, nurses, and administrators, and for eight years cooperated with Halifax in rebuilding her devastated district, housing her people, and administering the relief machinery.

The Civic Health Center is to a great degree the outcome of that cooperative relationship. Local conditions also played their part in its development. Halifax, being an active port of entry with a transient population and all that it implies, has had throughout her history to meet the problem of contagious disease. Public and private agencies carried on the fight, independently, in most instances, of one another's programs. The catastrophe of 1917 united them in a concentrated effort which was organized and directed by the Massachusetts-Halifax Health Commission. The Chairman of this Commission was G. Fred Pearson, a Halifax barrister and newspaper publisher who had been identified with the city planning program inaugurated before the tragedy of 1917. The opportunity to center the health agencies of the city was obvious, and as Mr. Pearson was a Governor of Dalhousie University, the task was simplified. By skillful management and a well-handled educational campaign, public opinion was aroused, and the agencies were brought together as a permanent unit in the present Center.

Hospitals and Organizations in the Group

The hospitals which are grouped around the Center include the Victoria General Hospital and Laboratory, the Children's Hospital, the Grace Maternity Hospital, the Halifax Tuberculosis Hospital, and the Halifax Infectious Disease Hospital. The City Home, with its hospital wards, is also located in the Center. A new Medical Dispensary and Clinic together, with residential quarters for a staff of public health nurses, has been added through a fund of $250,000 contributed by the Carnegie and Rockefeller Foundations.

The Dalhousie Medical School has coordinated the public clinic work of the five institutions so that its students receive a clinical and ward training that is unexcelled. The out-patient services include diagnosis and treatment, pre-natal education, prophylactic instruction, and a free dispensary. The Halifax Board of School Commissioners has recently installed a dental clinic, and the Provincial Department of Health maintains a treatment center for venereal diseases. Among the public service organizations associated with the Center are the Red Cross Society, which maintains a free milk distribution for children; the Halifax Anti-Tuberculosis League; the Victorian Order of Nurses; and the Halifax Welfare Bureau. The Halifax Rotary Club supports an orthopedic clinic for children. Offices and session rooms are maintained for these organizations.

Halifax has a population of about 60,000. From the point of view of an up-and-coming American city, it would probably be rated as a conservative community. But its record in municipal progress is worth study, from its famous botanical gardens to the huge port improvement program which was inaugurated before the Great War. The Health Center is a public service project capitalized by a catastrophe. The public has adopted it as a practical solution of a difficult municipal problem. Its success is attested by the records. In 1924 and 1925, the first two years of its existence, the Center served 6,683 out-patients. In 1929 is served 15,573.

Keeping City Plans from Being Pigeonholed

By **LATHAM C. SQUIRE**
Vice-President, Technical Advisory Corporation, New York

THE pay-as-you-go method for financing future public improvements has been accepted by some city planners as the most economical and reasonable method to pursue, and insisted upon by some smaller communities because of their fear of bond issues; but is it the right method?

Many well-thought-out plans for municipalities have been shelved and forgotten, sometimes, of course, for purely political reasons, but more often because of lack of full knowledge of the value of planning, and perhaps most frequently because the governing bodies lack courage in actually starting the planned projects owing to the *apparent* difficulty in financing them.

While the consultant is working with the planning board he endeavors to keep up their enthusiasm, but when the plans are finally adopted, their interest in the execution of the plan speedily wanes unless a tremendous effort is made to bring it forcibly before the general public. Almost invariably the governing body depends upon the planning board to keep the plan alive and out of politics.

On a strictly pay-as-you-go basis the municipality usually cannot afford to put through any costly major improvements for five to ten years at least. The general public gets tired of waiting and forgets all about the plan.

Is it much more expensive after all, and would it be unfair to the next generation, to make improvements wholly by bond issues instead of by the pay-as-you-go method? It is the writer's belief that in the end decidedly more can be accomplished, and with more satisfactory results, by financing the plan in this way, for the following reasons:

1. Urgent improvements can be started immediately.
2. The municipality reaps the benefit of the improvement now as well as in the future.
3. These are permanent improvements and benefit the next generation as well as this generation.
4. A good start on the construction program awakens and holds public interest.
5. The widening of an exceedingly crowded thoroughfare does take a strip of private land— 10, 15 or even 20 feet wide —off the tax rolls, but, on the other hand, it enhances the value of the remaining property tremendously.
6. The increase in the value of surrounding property creates an immediate increase in ratables which of course increases the income from taxes and would help materially in paying the carrying charges on a bond issue.
7. The cost of land, if purchase is delayed, is likely to be greatly increased in the future.
8. It is possible in many cases, particularly in small communities, to carry through the program in this way so that the total bonded indebtedness does not exceed 8 per cent of the assessed valuation of the municipality and a cash balance will remain from current revenue at the end of each year after all municipal expenses have been paid, including the carrying charges on the old and new indebtedness.

In carrying out this type of financing the master plan, care must of course be exercised to purchase only land and buildings that would be economically advantageous to the municipality. The purchase of expensive acreage for a park many years ahead of time should be done only after an exhaustive study of the amount and character of the past, present and future population growth and distribution. A misplaced park or playfield takes the property off the tax rolls and does not materially increase the value of the surrounding property. Neither should streets and highways be actually constructed until the need for them is apparent.

It is the writer's belief that if this method were followed, it would be found that, because of the smaller land, building and construction cost, the bond issues would be considerably smaller and that the greater income from taxes because of the immediate increases in the value of abutting properties would very nearly pay the carrying charges on the new bond issues.

The Operation of a Well-organized Department of Waste Collection and Disposal—Part I

By ALFRED E. HANSEN
Superintendent,
Division of Waste Collection and Disposal,
Pontiac, Mich.

THE city of Pontiac has for its collection service ten 1½-ton, 4-yard trucks, each equipped with hydraulic dumping hoists. For garbage collection each truck is manned with two men: each man collects and they alternate in driving the truck. For the collection of combustible rubbish, there is only the driver on each truck.

During the summer months the householders receive two collections a week, and during the winter months one collection. The year around, collections are made daily from hotels and restaurants, and stores receive three collections a week.

For the summer the city is divided into five districts, one truck being assigned to each district to collect the wrapped household garbage; a separate truck equipped with a false bottom is used to collect the unwrapped hotel, restaurant, and store garbage. The false bottom permits the draining out of a considerable amount of the free water before the garbage is burned. For the collection of combustible rubbish, available at the various manufacturing plants, two trucks are used.

During the winter months the city is divided into three districts, to each of which is assigned a truck, which collects all of the garbage in that district from households, hotels, restaurants, and stores. Only one truck is used for the collection of combustible rubbish.

In order to get a perspective of the collection system during the winter months, one week was selected during the month, and the following items studied:

1. The number of pick-ups per day for each district.
2. The number of miles traveled during actual picking, called "live mileage," and the number of miles traveled back and forth to the plant, called "dead mileage."
3. The hours spent collecting daily for each district.
4. The tons of garbage collected by each district.

A LOAD OF WRAPPED HOUSEHOLD GARBAGE

TYPE OF COLLECTION TRUCK USED IN PONTIAC

COUNT OF COLLECTION PICK-UPS

Date	Hotels	Restaurants	Stores	Apts.	Rooming-Houses	Two-Family Houses	Houses	Total	Total Tons
Feb. 17									
Dist. 1		31	1	7	3	7	184	233	
Dist. 2	2	25	14	5		20	209	275	
Dist. 3	1	20	3	7	2		308	341	
Total	3	76	18	19	5	27	701	849	10 74
Feb. 18									
Dist. 1			5	12	10	15	240	282	
Dist. 2	1	19	6	20			240	286	
Dist. 3		3	5	7	11		331	357	
Total	1	22	16	39	21	15	811	925	11.00
Feb. 18									
Dist. 1		19	3	6	1		275	304	
Dist. 2	2	25	3				250	280	
Dist. 3	1	22	6	9	12		265	315	
Total	3	66	12	15	13		790	899	12.29
Feb.20									
Dist. 1		1	4	36			275	316	
Dist. 2	1	22	11				347	381	
Dist. 3		4	3	6	16		293	322	
Total	1	27	18	42	16		915	1,019	10.99
Feb. 21									
Dist. 1		32	3	8	3	9	186	241	
Dist. 2	2	26	17	3			255	303	
Dist. 3	1	21	8	3	7		188	228	
Total	3	79	28	14	10	9	629	772	13 88
	11	270	92	129	65	51	3,846	4,464	58.90
Summary									
Dist. 1		83	16	69	17	31	1,160	1,376	18.91
Dist. 2	8	117	51	28		20	1,301	1,525	20.62
Dist. 3	3	70	25	32	48		1,385	1,563	19.37
Total	11	270	92	129	65	51	3,846	4,464	58.90

DISTRICT NO. 1

Date	Live Mileage	Dead Mileage	Total Mileage	Hours	Tons
Feb. 17	15	8	23	8¼	3 45
Feb. 18	11	10	21	7¾	3 40
Feb. 19	14	14	28	8¼	4 00
Feb. 20	11	14	25	8¼	3 65
Feb. 21	13	9	22	8	4.41
Total	64	55	119	40½	18.91

DISTRICT NO. 2

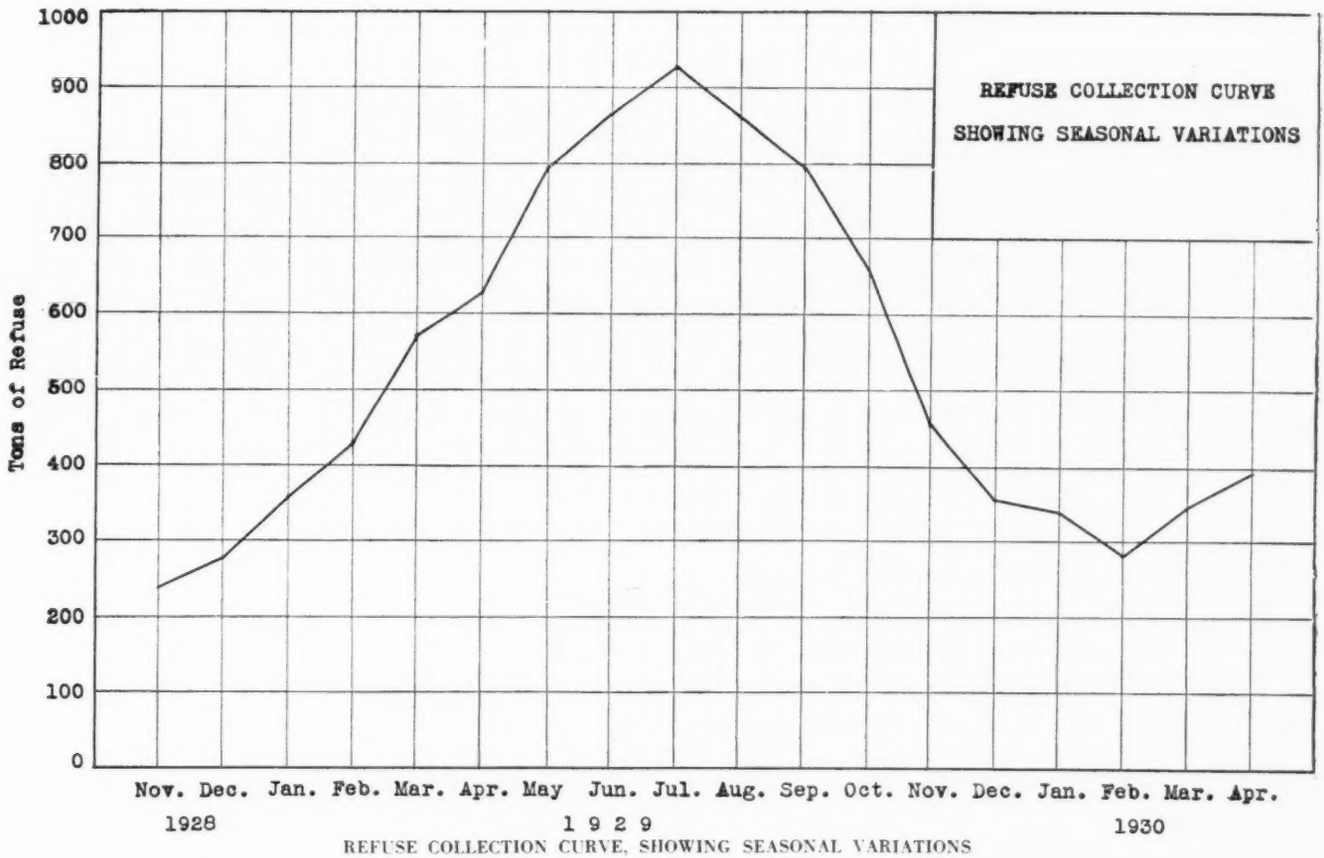
Date	Live Mileage	Dead Mileage	Total Mileage	Hours	Tons
Feb. 17	14	7	21	8	3.73
Feb. 18	11	11	22	8	4 10
Feb. 19	10	12	22	8½	4 02
Feb. 20	12	12	24	8½	3 90
Feb. 21	11	12	23	7¾	4 87
Total	58	54	112	40¾	20 62

DISTRICT NO. 3

Date	Live Mileage	Dead Mileage	Total Mileage	Hours	Tons
Feb. 17	12	12	24	8¼	3 57
Feb. 18	11	16	27	8	3 49
Feb. 19	12	13	25	8½	4 26
Feb. 20	11	16	27	8	3 44
Feb. 21	11	14	25	8	4 61
Total	57	71	128	41	19 37

SUMMARY

Live Mileage	Dead Mileage	Total Mileage	Total Hours	Total Tons	Total Pick-ups
179	180	359	122¼	58.90	4,464



REFUSE COLLECTION CURVE, SHOWING SEASONAL VARIATIONS

Records

A daily record of the following is kept for each district:

1. Number of loads brought in
2. Number of tons brought in
3. Number of miles traveled
4. Number of hours spent in each district
5. Number of complaints from each district

At the end of each month these data are summarized and any inequalities among the districts are rectified by reapportioning them.

For the purpose of obtaining unit cost data for each month, the man-hours per ton of garbage and per ton of rubbish are computed. In addition to this, the miles traveled per ton of garbage and per ton of rubbish are also calculated. The following is a summary of the collection data for the first four months of 1930:

COLLECTION DATA

	Jan.	Feb.	Mar.	Apr.
Garbage collected (tons)	257.43	237.76	270.87	299.85
Rubbish collected (tons)	81.38	45.69	76.30	92.27
Total garbage and rubbish collected (tons)	338.81	283.45	347.17	392.12
Man-hours per ton of garbage	4.82	4.24	4.08	3.78
Miles per ton of garbage	7.29	6.41	6.37	6.00
Man-hours per ton of rubbish	1.82	2.22	1.82	1.39
Miles per ton of rubbish	10.53	7.81	9.49	7.13
Man-hours per ton of garbage and rubbish	4.10	3.92	3.59	3.22
Miles per ton of garbage and rubbish	8.07	6.64	7.05	6.26

The average annual cost of collecting refuse is about $4 per ton. This figure includes supervision, labor, trucking expense, insurance and incidentals.

Reports

At the end of each month a report is submitted covering the work done by the Division of Waste Collection and Disposal.

MONTHLY REPORT

May 15, 1930.

Mr. James R. Pollock
City Engineer
Pontiac, Michigan

Dear Sir:

The following is the report of the Division of Waste Collection and Dis posal for the month of April, 1930.

During April we received 417.03 tons of refuse which consisted of 25.9% rubbish. It may be segregated as follows:

Garbage collected by the city	299.85 tons	
Rubbish collected by the city	92.27 tons	
Total collected by the city		392.12 tons
Garbage brought in by outside trucks	9.27 tons	
Rubbish brought in by outside trucks	15.64 tons	
Total collected by outside trucks		24.91 tons
Grand total		417.03 tons

	Garbage	Rubbish	Garbage	Rubbish	Total
On hand April 1, 1930					
Received during April	309.12	107.91			
From stock pile		2.52			
Total	309.12	110.43	309.12	110.43	419.55
On hand May 1, 1930		3.86			
For hog feed	44.64				
To stock pile		16.97			
Total	44.64	20.83	44.64	20.83	65.47
Total refuse incinerated			264.48	89.60	384.08

For heating purposes 2.65 tons of coal were received. One hundred and five dogs and thirty cats were incinerated.

PLANT OPERATION FOR APRIL, 1930

	Total	Per Ton
Total refuse incinerated (tons)	354.08	
Per cent rubbish	22.5%	
Man-hours charging	124.50	0.351
Man-hours stoking	66.75	0.189
Total man-hours burning	191.25	0.540
Man-hours pulling ashes	72.25	0.204
Man-hours wheeling ashes	65.50	0.185
Total man-hours cleaning	137.75	0.389
Total man-hours cleaning and burning	329.00	0.929
Hours burning	66.75	
Tons per hour per cell (rate 1.00 ton)	1.33	
Wheelbarrows of cans and ashes	1,655	
Weight of cans and ashes (tons)	71.05	
Per cent ash	20.1%	
Kwh. per ton	359	1.01

Attached is an analysis of the collection for April, as well as the truck mileage and complaint sheet.

Respectfully submitted,
A. E. HANSEN
Superintendent.

WASTE COLLECTION AND DISPOSAL
DAILY COLLECTION REPORT
SUMMARY FOR APRIL

Date—April District Number	Number Loads	Total Weight	Hours	Miles	Complaints Just	Unjust	Total
1	70	199,540	186¼	577	19	55	74
2	73	200,995	187¼	503	4	36	40
3	73	196,225	188½	645	10	43	53
Total	216	596,760	562	1,725	33	134	167
Complaints	6	2,930	8¼	74			
Total garbage	222	599,690	570¼	1,799			
Total rubbish	99	184,545	123¾	658			
Grand Total	321	784,235	694	2,457			

	Tons	Miles	Man Hrs.
Garbage	299.85	1799	1134¾
Rubbish	92.27	658	128
Total	392.12	2457	1262¼

Comments: Garbage—1 ton = 3.783 man-hours — 6.00 miles
Rubbish—1 ton = 1.387 man-hours — 7.13 miles
Total —1 ton = 3.219 man-hours — 6.26 miles

Signed.....
Alfred E. Hansen.

SCHEDULE OF PLANT OPERATION FOR NOVEMBER, 1930
A Month Selected to Show Optimum Conditions

	Total	Per Ton
Total refuse incinerated (tons)	330.36	
Coal used (tons)	27.71	168 lbs.
Per cent of rubbish	16.04%	
Man-hours charging	73.25	0.222
Man-hours wheeling	70.50	0.213
Total man-hours burning	143.75	0.435
Man-hours pulling ashes	50.17	0.152
Man-hours wheeling ashes	52.50	0.159
Tota. man-hours cleaning	102.67	0.311
Total man-hours cleaning and burning	246.42	0.746
Hours burning	70.50	
Tons per hour per cell (rate $1.00 ton)	1.56	
Wheelbarrows of cans and ashes	1,209.0	
Weight of cans and ashes (tons	55.40	
Per cent of ash	16.8%	

Complaint Sheet for April, 1930

Date	New Cans	Not Due	Had Been Late	Had Been Missed	Had Been Picked	Tin Cans	Unobtainable	Special	Improper Receptacle	No Such Number	Not Wrapped	Vacant House	Total
1			1	1									2
2	5							2	1				8
3	3	2		1		1							7
4													0
5	1												1
7	4												4
8	2					1							3
9	2					1	1						4
10	2			1			1						4
11	6	3		3									12
12				2			1						3
14	8	1			1	1				1			12
15	7			1	2		1						11
16		3	1		1								5
17	6	2			2		1						11
18	5	2	1	1	1	1				1			12
19	2		1		2			1					6
21	6	1	6	2					1				16
22	2	2	2			1			1				8
23	1		3										4
24	1		2		1			1					5
25	1			2					1				4
26	3												3
28	4												4
29	4	2		1							1		8
30	4	3	1		1							1	10
Total	79	21	18	15	11	6	5	4	4	2	1	1	167

Truck Mileage Sheet for April, 1930

Date	No. 260	No. 261	No. 262	No. 263	No. 264	No. 265	No. 266	No. 267	No. 268	No. 269	No. 270	Total
1	6	23	18	Y		22		21		29	7	126
2	11	20	21	Y		3		24	25			104
3		28	25	Y		10	13	30	1			107
4	15	24	19	Y			4	26	13	9		110
5	10	6	14	Y		24		12	14	7		87
7	17	22	23	Y		13	8	31		13		127
8	6	23	17	Y		25	11	24		5		111
9	16	23	17	Y		27		21	14	6		124
10	1	27	23	Y				32		13		96
11		25	21	Y	4	25		Y		27		102
12	10	7	10	28	8	22	7	Y	13	13		118
14	13	22	23	5	1	14	17	Y	Y	35	8	138
15	7	23	16	25	7	30	9	Y	Y	22		139
16		12	12	4	8	D. S.		Y	Y	15	4	55
17	8	23	21	4	2	35	1	Y	Y	25	21	138
18	21	8	25		7	41	18	Y	Y	27	4	151
19	23	Y	20			22	D. S.	Y	Y	28		93
21	24	Y	23		5	23	18	Y	Y	31		124
22	22	Y	18	7	9	28	5	Y	Y	30	7	126
23	6	Y	19	16	10	27	4	26	Y	30		138
24	6	Y	25		5	9	21	24	Y	29		119
25	1	Y	26	4	D. S.	15	3	31	Y	31	4	115
26	10	Y	7	13	D. S.	3		15	Y	19		67
28		9	22	20	3	9	9	31	Y	16	3	122
29		22	18	5	5	22		30	Y	Y		102
30		23	20	1	6	11	15	20	Y	Y		96
Yd				12								12
Inc	233	370	503	120	80	458	163	398	80	460	58	2923
Total	233	370	503	132	80	458	163	398	80	460	58	2935

Statistics on Garbage Collection and Disposal

for 557 cities of 4,500 population and over, are presented in Section 11 of The Municipal Index for 1930.

Preventive and Remedial Measures for Icy Pavements

By **GEORGE H. DELANO**
Maintenance Engineer,
State Department of Public Works
Boston, Mass.

IN discussing the control of icy pavements on Massachusetts state highways, it is necessary also to discuss the clearance of snow from these highways, as both operations are performed by the same organization, and part of the same equipment is used in both cases.

While the clearance of snow is dictated primarily by economic considerations, and the control of icy pavements by considerations of safety, I believe that the necessity for the clearance of snow from the main traveled routes was the first to be recognized, and eventually led to organized efforts by a central agency. In Massachusetts the agency selected was the Department of Public Works, which was instructed by the Legislature, in an act passed in 1927, as follows: "at the expense of the Commonwealth to keep such state highways or parts thereof as the Department may select sufficiently clear of snow and ice to be reasonably safe for travel." It will be noted that in addition to authorizing the Department to clear snow from the state highways, the Act also includes a provision to enable the Department to keep the state highways reasonably safe for travel when the surfaces are icy. The phrase "reasonably safe for travel" is significant.

In carrying out the provisions of the Act, the Department made use of the maintenance organization and such of its equipment as was suitable for the purpose.

Organization

For its purposes, the Department has divided the state into seven districts, in each of which a District Highway Engineer is in responsible charge of all highway activities. The districts, in turn, are divided into maintenance sections, comprising from 30 to 50 miles of state highway, each in charge of a maintenance foreman, whose duty it is to supervise the work of maintenance and snow and ice clearance.

Equipment

The Department owns and operates 100 Ford and Chevrolet 1½-ton dump-trucks, seventeen 1½-ton trucks of greater power, 120 F. W. D. trucks and 23 tractors. All are equipped with either blade or V-plows, all are used on snow removal and most of them at times for the removal of ice from the surface. In addition to this general equipment, the Department also owns 30 mechanical sand spreaders of the roll and brush type.

Preventing the Formation of Ice

The instructions issued to govern the organization and the use of equipment are intended to prevent the formation of ice on the surfaces, and, where this is not possible, otherwise promptly to correct conditions.

A WINTER HIGHWAY CONDITION WHERE ICE WILL RESULT UNLESS A CUT IS MADE THROUGH THE SNOW BANK TO PERMIT DRAINAGE

The office of the Maintenance Engineer at Boston is in receipt of daily reports from the Weather Bureau, which further cooperates by making telephone reports when storms of unusual violence are impending. The district offices are then informed by telephone of these reports, so that when storms are expected, their men and equipment are in readiness to start promptly. Arrangements are made with all local police forces that the foremen be informed of icy conditions arising at night due to an unexpected drop in the temperature. Work always starts at once, irrespective of the hour. The instructions formerly were to start the plows when two inches of snow had fallen. Too much packed snow was found to result, so that now the plows start as promptly as possible.

The trucks work in pairs and are required to remove all snow from the surface. This is the most important step in the control of icy pavements—a clean surface when the storm stops. If the snow is dry and is being blown back onto the surface, the plowing is continued until the drifting stops. If, however, the surface is not plowed clean, and packed snow results, the blade plows are continued at work if they are effective; if not, the packed snow can sometimes be broken up and removed with V-plows on trucks, or by the snow grousers on the tractors, or by center pressure blades on trucks. The time to remove this accumulation is while it is still snow, for it will soon turn to ice if permitted to remain. At times, because of the character of the storm, it is difficult to prevent the formation of packed snow on the surface. During the past two years many storms were experienced during which not more than 2 inches of snow fell, but so slowly that it was at once packed into ice by the passing vehicles.

REMOVING SNOW FROM THE EDGE OF THE HIGHWAY WITH A TRUCK-MOUNTED V-TYPE PLOW AFTER THE SURFACE HAD BEEN CLEARED

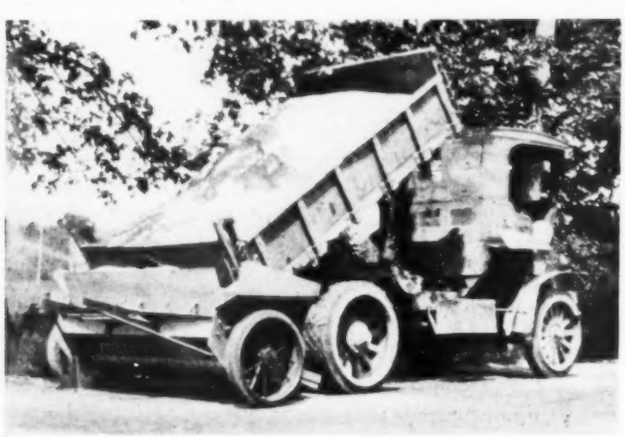
Tackling Ice After It Has Formed

When ice does form as a result of snow remaining on the surface, it is broken up by applying calcium chloride direct, and then removed by the blade plows, or it is covered with coarse, gritty material to restore traction.

A second condition susceptible of control is that which arises when water from melting snow and ice at the side of the road, particularly in cuts and at the top of banked curves, flows over the surface and, when the sun goes down, freezes. It is frequently possible to prevent this by clearing the snow beyond the traveled surface so as to include the shoulders, by shoveling out the ditches, by cutting waterways throughout the banks of snow thrown up by the plows, and by opening and clearing all catch-basins, culverts and waterways. At times, however, ice will form in patches, and this is particularly dangerous, as it occurs here and there on surfaces that are otherwise clean and dry. Such ice does not last long, and it is generally sufficient to sand it.

Sleet Storms

While the conditions mentioned can be controlled to a large extent, sleet storms cannot be foretold. When they come it is necessary to work quickly. There is no remedy except to sand. One application of sand is not always sufficient, as subsequent melting, followed by a drop in the temperature, or the continuance of a sleet storm after the sanding has started, covers the applied sand with ice and again creates a bad condition.



THE TRAILER TYPE ROLL AND BRUSH SPREADER USED TO DISTRIBUTE CALCIUM CHLORIDE AND SAND ON THE ICY ROADWAY

From the foregoing it is evident that the ice forming from snow left on the surface may be thick and strong, and that it will remain as long as the weather is cold unless broken up or melted and removed. If permitted to remain, it must be sanded, and sanding this kind of ice is not satisfactory, as the effects are temporary and frequent applications are necessary over long stretches of road. If it appears that the temperature will not be such as to cause the ice to melt during the next day, calcium chloride is applied at once.

Spreading Calcium Chloride and Sand by Machine

Ice forming as a result of sleet storms or from melted snow is not permanent in its character, for generally it is thin and will readily disappear when the sun is shining. It presents a different problem in that it usually forms after the sun goes down, appearing at the same time on all the roads, and is very slippery. Because of this widespread and almost instantaneous appearance of ice on the surfaces, prompt and speedy application of sand is imperative and it should be applied simultaneously in as many different places as possible. Hand labor is adequate if there is sufficient time to round up the number of men required and if there are sufficient men available. Inasmuch, however, as prompt action is required and a large number of men cannot be readily called out, particularly at night in the country districts, it is necessary to speed up the work through the use of mechanical spreaders.

This the Department has done, a type of trailer spreader being used with dump-trucks that permits of a uniform distribution of any size aggregate at any desired amount per square yard. The material used to spread on the ice is either coarse, sharp sand, cinders or stone chips. Stock piles are put out each fall at regular intervals along the roads. Each pile is impregnated with calcium chloride, and additional calcium chloride in drums is kept at each pile. It is thought now, however, that it is better to mix the calcium chloride with the sand or cinders while loading the trucks, as the calcium chloride in the piles leaches out and is lost.

Dump-trucks are used with the spreaders and may be of any capacity from 1 ton to 7 tons. They are loaded at the stock pile, one shovelful of calcium chloride being thrown in with each four to six shovelfuls of sand, depending upon conditions, the roll and brush of the spreader providing an intimate mixture by the time it goes on the road. Hills, curves and intersections are first sanded, the truck proceeding at from 15 to 20 miles an hour; the flow of sand can be started and stopped without stopping or slowing down the truck.

In this way a load of sand on a Ford or Chevrolet dump-truck will spread a strip five feet wide for a mile and a quarter. If curves, hills and intersections only are being sanded, one load will last three or four miles. Frequently the first strip is spread a little heavier than usual in the middle of the surface, thus immediately providing traction for vehicles going in both directions. During the past year 1,468 miles of state highway was cleared of snow, and all icy surfaces sanded when necessary throughout the winter.

No "Puddle, Tamp, Fill and Forget" in Oshkosh

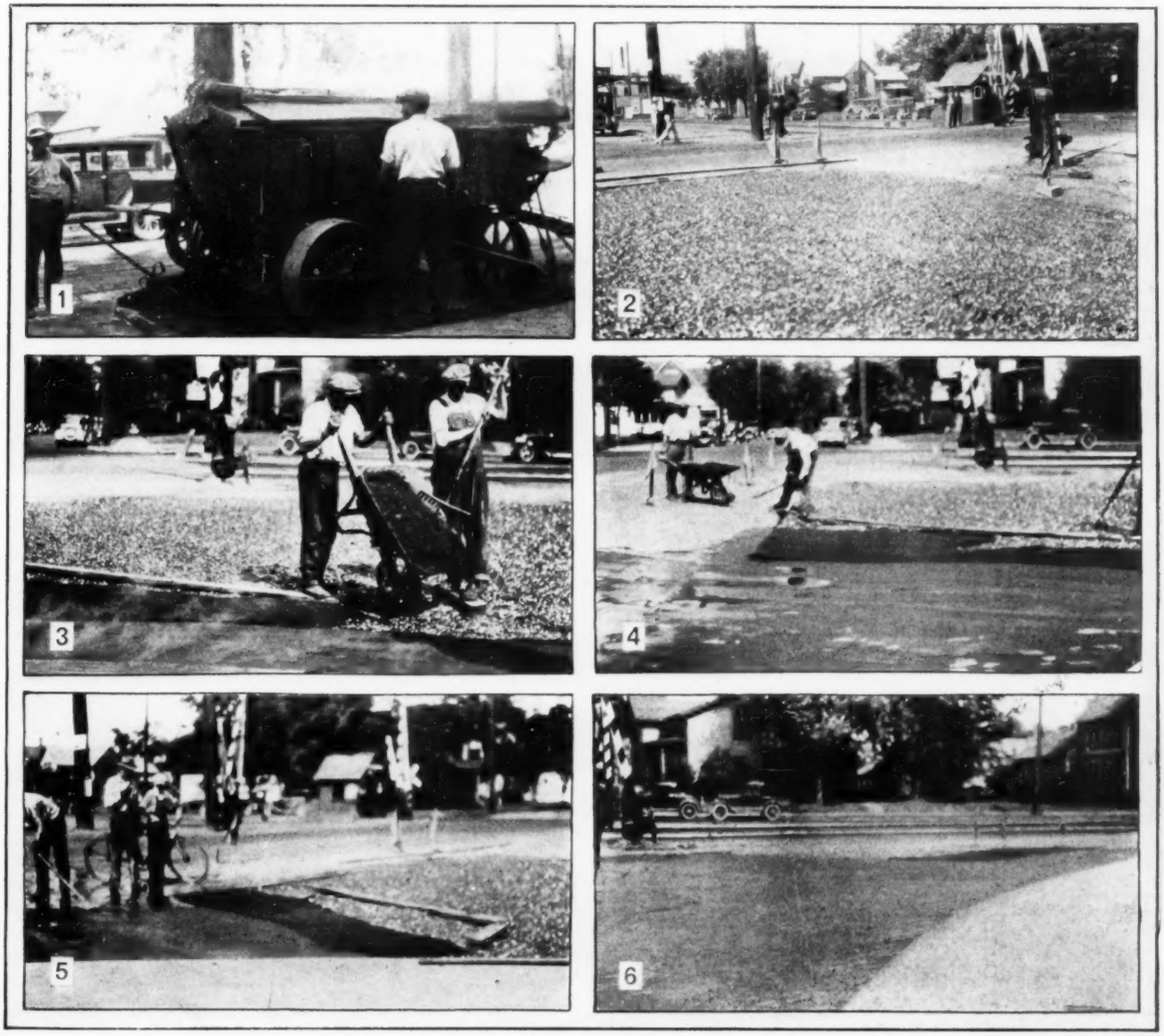
Railway Crossings and Patches Built to Last

OSHKOSH, WIS., was named for Chief Oshkosh of the Menominee tribe of Indians, in the midst of whose hunting-grounds the "Sawdust City" sprang into being. As municipal expenses in Oshkosh have shown a steady and gratifying decline in recent years, while taxpayers in many other cities have been groaning under increases, it will be worth while to make a brief survey of the methods by which the 54 miles of improved streets in Oshkosh are kept in excellent condition at comparatively small expense.

Examples of Economies

It has been found possible to reduce expenses, although the city is growing rapidly, by making short cuts wherever possible. A street-marking system, including street signs, is one of the short cuts, as the city can produce, for $2.03 each, signs that ordinarily would cost $7.00. The city has put in a pumping head at every bridge—it may be said in passing—by means of which the Fire Department can pump with ample pressure direct from Fox River should anything go wrong with the regular hydrant system.

Portions of streets undergoing repair are guarded and shut off from traffic by means of huge wooden "horses." Four large horses, as used in most cities, are about all that can be piled on a truck for transportation. In



STEPS IN LAYING A SMOOTH-RIDING RAILROAD CROSSING

1. A mixed batch from the portable asphalt plant ready to be placed upon the penetrated base. 2. The rolled keyed stone penetrated ready for the top. 3. Placing the hot mix on the penetrated base. 4. Raking over the hot mix 5. Smoothing the edges with hot irons. 6. The finished job

Oshkosh the tops are made removable and the legs collapsible, after the manner of a stepladder, so that as many as forty can be handled at one time.

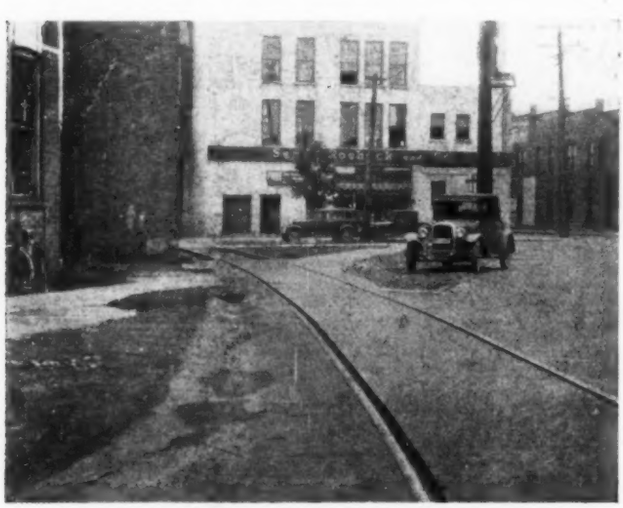
Removing the Old Street-Car Rails

Recently, Oshkosh substituted motor-busses for its street railway, and the street-railway tracks had to be removed. The Street Superintendent designed and built a sort of steel sled, so shaped that when it is placed under the end of a rail and pulled by the city's steam roller, enormous leverage results. The steam roller and rail sled were able to rip rails from the ties as fast as the roller could move forward, saving the city $6,000 in two weeks, compared with the usual laborious method of track removal.

Standardized Railway Crossings

Oshkosh has standardized on a railway crossing which is attracting wide attention from railroad officials. Nine crossings out of every ten that need replacing are low in the center and high at the curb edge, with no load-carrying ballast beneath waterlogged and rotten ties. First of all, therefore, in Oshkosh, the railroad company is required to replace the ties on 6 inches of new No. 1 stone ballast. The track is brought up to grade, and a mudrail is placed inside the running-rail to provide space for the flanges of the car wheels. From the bottom of the tie to the street grade the city puts in penetrated No. 3 stone with a top dressing, allowing 1½ inches for settling. Before penetration, the ties are thoroughly tamped and the stone is rolled until it is keyed together, and several trains are permitted to pass over the crossing. Tarvia is then pumped onto the stone until it penetrates 5 inches—about ¼-gallon to the square foot of surface. If a greater penetration than 5 inches is required, double penetration is used. For example, if an 11-inch depth of stone is to be penetrated, a 5-inch layer of stone is first put in, rolled and penetrated; then a 6-inch layer of stone is added and rolled and penetrated—independently.

To this base a top course is added, making a mat about one inch thick. The Oshkosh specifications for this mat call for the following mixture: roofing gravel, 2 cubic feet, or 200 pounds, or 46.8 per cent; sharp sand, 2 cubic feet, or 180 pounds, or 42 per cent; limestone or portland cement, 4 shovelfuls, or 3.5 per cent; Tarvia X, 4 gallons, or 33 pounds, or 7.7 per cent; a total of 428 pounds, all carried in the portable Western asphalt plant, which is worked nine hours a day, nine months a year. The stone, sand and dust are thoroughly mixed before adding the Tarvia. When the surface has been completed, the edges of the work are sealed with clear Tarvia X and hot-ironed. The crossing can be opened to traffic as soon as the surface cools. The cost of the completed work is approximately $3.15 to $3.25 per square yard.



A GUTTER MADE FROM MATERIAL PRODUCED BY THE HOT PATCH OUTFIT

Other Work of the Asphalt Plant

The portable asphalt plant is used for heating the binder in penetration work, drying out the aggregate and sand, heating the tools, mixing the top course, etc. Ordinarily, three men constitute a crew for the portable plant. In railroad-crossing work, however, five men are used, so that two men can be mixing while the others are wheeling the mixture to the crossing and getting needed fresh air. Tarvia is preferred to asphalt at the railroad crossings, but most of the streets have an asphalt surface. Oshkosh has 54 miles of paved streets: asphalt on concrete base; asphalt on stone and sand fill base; asphalt on waterbound macadam; brick on concrete; creosoted block on concrete; Tarvia penetration and Tarvia macadam. In addition to these, important gravel streets are kept oiled. The patching of the city's many miles of pavement is occasioned largely by service cuts made by plumbers and public service corporations.

Oshkosh realizes the necessity of having all patches uniform and properly put down; therefore, all such repairs are made by the city Street Department. The concern which has been authorized to cut the pavement is permitted to backfill the hole, but nothing more. The Street Department puts down the patch, and the plumber or public service corporation pays the cost, which averages about 40 cents a square foot.

Patching with Portable Plant

One patch was about 250 feet long, on a business street, where the pavement had been cut throughout the length of the block to permit the laying of a water pipe. It was practically impossible to tell, except at the very edge of the cut, which was patch and which was original pavement. The average patch is much smaller, but all are of the same durable character. The ordinary procedure for making repairs in many cities has been to puddle, tamp, fill and then forget. That won't do in Oshkosh.

In making the patches, the portable plant is pulled from patch to patch by the steam roller, which can move four miles an hour without injury to the streets. The hole to be repaired is squared up. The portable asphalt plant contains compartments for the various materials where the asphalt can be heated and the aggregates dried, and a mixing pan into which they may be drawn in proper quantities.

The mixture is spread over the surface of the hole, and hot-ironed, and the patch is then opened to traffic. In winter work, the entire excavated base is taken away and the hole backfilled with sand. As many as twenty patches have been made in one day, covering areas all the way from 2 to 4 feet wide, and 3 to 20 feet long.

When a concrete base is necessary, steel reinforcing bars are set diagonally, crisscrossing each other, and driven into the firm earth at either side of the hole, and the concreting is carried 8 inches to each side and made 2 inches deeper than before. A 1:2:3 mix is used. This

wedge-like base is then allowed to set four or five days before putting on the patch.

Organization

For convenience, the Street Department has divided the city into three districts, each having a foreman, four men and one truck. In addition to these there is a general crew in charge of all machinery for repair work, and for street cleaning, owing to automobile traffic, etc. Each permanently improved street is cleaned twice a week, the work being done at night. Each complaint received by the Street Department is personally investigated by the Superintendent, who finds about half the complaints unjustified. The complaints that are justified are referred to the proper crew, and the result is permanently recorded and filed. The filing card gives the date and hour the complaint was received; its location; how it was received —by person or letter, etc.; the name and address of the complainant; the class of complaint, whether pavement, sidewalk, sewer, etc.; to whom the complaint was referred and when; and its final disposition.

A requisition form, made out in duplicate, received by the repair department, shows the date of receipt; by whom filed; the repairs needed; date of inspection and by whom inspected; and, under "Remarks," information as to how and when the repairs were made. In addition to these files, there is a "cost sheet," also in duplicate.

About 44 men are employed by the Street Department in all capacities from May until November. This number is somewhat less during the winter season, except when snow removal becomes necessary.

The Street Department is in charge of Councilman George F. Oaks, with George C. Luck as Superintendent.

Taking Care of the Neglected Twins— Garbage and Refuse

By **L. J. HOUSTON, JR.**
City Manager, Fredericksburg, Va.

AMONG the features of civic life that are essential to health as well as happiness are the collection and disposal of those municipal wastes commonly classed as garbage and rubbish—those twins which have always persisted to the discomfort and detriment of every community.

While these obnoxious twins have been ever present to torment us, comparatively little serious thought or study has been expended in their proper handling or control. Elaborate plants have been built to insure the purity of the food and drink of the municipal individual in order that his health may be promoted, and other plants have been provided to so collect and treat his sewage wastes that they may be harmless and inoffensive to his neighbor and himself. But the sooner and easier the "buck" regarding the twins could be passed, the happier the civic fathers were. Quite generally it was passed to some contractor who was more concerned with increasing his own profit than he was with the public welfare or the community happiness. With few exceptions, the only method of disposal was hog-feeding or dumping. In the case of hog-feeding, only hog-feeding garbage was collected. In the case of dumping, even worse conditions prevail, due to the odors of decaying matter and the prevalence of rats which thrive there.

Real Thought Now Being Expended

It is pleasing to know, however, that the more progressive civic officials and some of the best scientific men are realizing that this matter is in serious need of more careful treatment than has hitherto been accorded it. Several of our national civic associations have com-

TWO VIEWS OF THE COLLECTION TRUCKS USED IN FREDERICKSBURG, VA., FOR THE REMOVAL OF GARBAGE AND REFUSE

mittees specially assigned to study the best methods of handling garbage and refuse. Much good progress is being made, yet it is surprising that comparatively few of our municipalities really avail themselves of these improvements. It is only necessary for one to make even a casual survey of the methods used by some of his nearby municipal neighbors, large and small, to ascertain how they live in the past as regards these twins.

They apparently dislike changes of methods. New York, for instance, still litters its sidewalks with garbage and trash receptacles of all kinds and conditions, and although it operates a few incinerators which are doing excellent work, it dumps the major portion of the contents of the sidewalk receptacles virtually at its own front door, a short distance beyond the entrance to its harbor. And what is said of New York can be said of practically all our larger and wealthier municipalities. Last year, in an inspection trip of a number of municipalities, both large and small, for the purpose of studying the methods of collecting, handling and disposing of garbage and rubbish wastes, I was somewhat surprised to find that the best methods were generally to be found in the smaller cities rather than in the larger ones.

Misdirected Civic Effort

In general, great exertions are made to increase the size of the city, the number of industries, and the amount of wealth, while many of the wastes are collected and disposed of by unscientific and unhealthful methods. I do not mean that population, industries and wealth should be ignored, but I do submit that they cannot, of themselves, assure health and happiness. When I visit large municipalities and view the beautiful boulevards and parks, the costly public buildings and all the other evidences of wealth, I am impressed, but when I pass along the streets and see the sidewalks still being littered in this unwholesome manner, I am amazed. Still, I am assured that these are most progressive cities, and doubtless they are in some respects, but how much happier their citizens would be were even this one feature of municipal endeavor conducted in keeping with some of the more spectacular municipal activities; if it were conducted for the comfort and happiness of the citizens, who in reality are paying for the service, rather than for the convenience of those who are being paid to render the service. Every occupant of every building is vitally affected by the degree of perfection with which water is furnished to the city and sewage and other wastes are removed.

Aims in Fredericksburg

Fredericksburg, in seeking the best solution of such problems, has endeavored to become a happy as well as a healthy place in which to live. After building a modern filtration plant to provide pure, wholesome water, supplying sanitary sewers to more than 99 per cent of the buildings, and paving more than 90 per cent of the streets with inexpensive, though highly effective, asphalt paving, we undertook to solve the problem of the collection and disposal of the garbage and trash. The first criterion for this service was that it must be designed primarily for the health and happiness of the householder rather than for the convenience of the department performing the service. That this specification has been successfully met is evidenced by the universal commendation received from the citizens.

Disposal by Incineration

After a careful study of the various methods of disposal, Fredericksburg unhesitatingly decided on incineration. Accordingly, following further study and inspections, a modern incinerator was built in which all garbage and trash, including leaves, are burned. In this incinerator coils were placed so as to utilize the heat therefrom to heat the water for can washing.

The manner and method of collecting these wastes and transporting them to the incinerator is as important as the final disposal, but the solution of this problem was more difficult. The prevailing method of using open carts or trucks was soon eliminated, since it so ineffectually met the requirements of the criterion of Fredericksburg. While the closed truck body was a great improvement over the open body, that too was discarded, since, while it was convenient to the collecting department, it gave the householder no greater relief than did the open-body truck.

This of necessity brought about the use of the can system. While there were several such systems in operation, in no single instance was the service complete. In some cities cans were furnished by the city and in others by the householders, but in practically every city where the can system was used, only garbage was collected, and in most of these cases only hog-feeding garbage was permitted in the cans. Trash, including tin cans, glass and other refuse, was collected only at infrequent intervals.

The Can System Adopted

As no one city was found whose system met the requirements of Fredericksburg, it was decided to take the best features of several, and to improve and modify them to suit local needs. In order to simplify and facilitate handling, it was decided that the city should furnish the cans, the first can being furnished free to each family, store, restaurant, etc., and any additional cans being furnished and serviced at a charge of ten cents per can per collection. It has been found that one can is ample in each case, except for boarding-house, hotels, and restaurants. Anything that is burnable, construing tin cans to be burnable, may be placed in the can.

In addition to what is in the can, any and all rubbish and trash is collected at the same time the can is changed, provided it is in a bundle, bale or other container so secured that a man may safely carry it without spilling. The bundles must not exceed 4 cubic feet in volume nor weigh more than 75 pounds. No charge is made for removing trash or rubbish, and the only separation required to be made by the householder is that the unburnable materials be placed in a separate container from the burnable. Garbage liquor is disposed of through the sink into the sanitary sewer.

The cans are galvanized, with smooth sides, 14 inches in diameter and 18 inches high. They have a capacity of 12 gallons, are fitted with a tight cover, and are specially made, having the word "CITY" stamped by special die in the bottom of the can as well as in the cover. The cans are simply loaned to the householders, who are held responsible for the safety of them.

Bags Furnished for Leaves and Trash

In addition to the cans, the city furnishes specially designed burlap bags, also free, for the convenience of the householder, to hold leaves and other light trash.

The full bag is removed and another empty bag left, if desired. These bags are also used by the Street Department in gathering leaves from the streets during the leaf-dropping period. Patrol cleaners gather the leaves into the bags, using specially designed frames on wheels for holding the bags open. The filled bags are left on the curb, to be picked up by the garbage trucks as they pass along the routes. This method not only makes it possible to keep the streets in better condition, but saves the use of a truck, which was formerly employed for this purpose. The use of bags by the householders obviates burning the leaves or raking them out on the street, both of which practices are now prohibited by ordinance.

Type of Trucks Used

For collection we use two trucks of 1½-ton capacity each, with bodies designed and built in the city shop. The bodies are 6 feet wide and 16 feet long. The front portion is provided with two decks, on which a total of 66 cans are carried, and an upper deck for carrying a spare tire, rain clothes for the collectors, spare cans and excess trash. The rear portion is a box of 150 cubic feet capacity for trash. This box is open at the top and is provided with three doors at the rear for unloading at the incinerator.

Collection Routine

The city was divided into twenty-seven routes, and a map was made of each route. On these maps not only the exact route of the truck was shown, but the location of each can as well. A set of these route maps is always carried by the truck driver, who is held responsible for the collections on his routes.

The trucks start out in the morning with a load of clean cans. Two collectors go with each truck, but only one collector is needed to service a place. He carries the clean, empty can into the property, collections being from the back door or back yard, and brings out the full can and excess trash, if any. In necessary cases he will make a second trip. When the end of the route has been reached, the loaded truck, with the collectors, proceeds to the incinerator, which is located on the City Farm, about a mile from the city. Arriving at the incinerator, the driver and his two collectors unload the truck and reload it with a fresh load of empty, clean cans, which are waiting. As it requires about an hour for a truck to make a round trip, they are so timed that they will not interfere with each other. One truck starts at 7:00 and the other at 7:30 in the morning, and each crew is easily able to complete its seven trips and wash off its truck within the allotted day's work.

Work at the Incinerator

While the collectors are busy during the day, the two men at the incinerator are not idle. One man dumps the contents of the garbage cans into the incinerator and attends to the other duties of operating the plant. The other man spends his time washing the cans and stacking them for later use. In addition to the trash and rubbish brought by the collecting trucks, the incinerator receives a quantity of trash and rubbish from large stores, factories and private haulers, all of which materials are received without restriction, except that unburnable matter must be kept separate. To take care of the non-combustible material, there is a bin just outside the incinerator door. At intervals the material in the bin is emptied, through a gate at the lower side, directly into a truck and conveyed to a dump on the farm.

Cost of the Service

About 900 cans are collected each day, and the entire city is covered three times each week. The labor cost for collecting is $93.00 per week, and for operating the incinerator and washing cans, $31.50, a total of $124.50 per week for handling the troublesome twins. With the reduced collections during the winter months, the total labor costs for the year are approximately $0.84 per capita of population. This cost could be reduced somewhat by requiring the householders to do part of the work, such as placing the wastes on the curb and returning the empties. The citizens feel that the added cost is money well spent for the excellent service they are receiving.

Community Health Objectives and Their Attainment

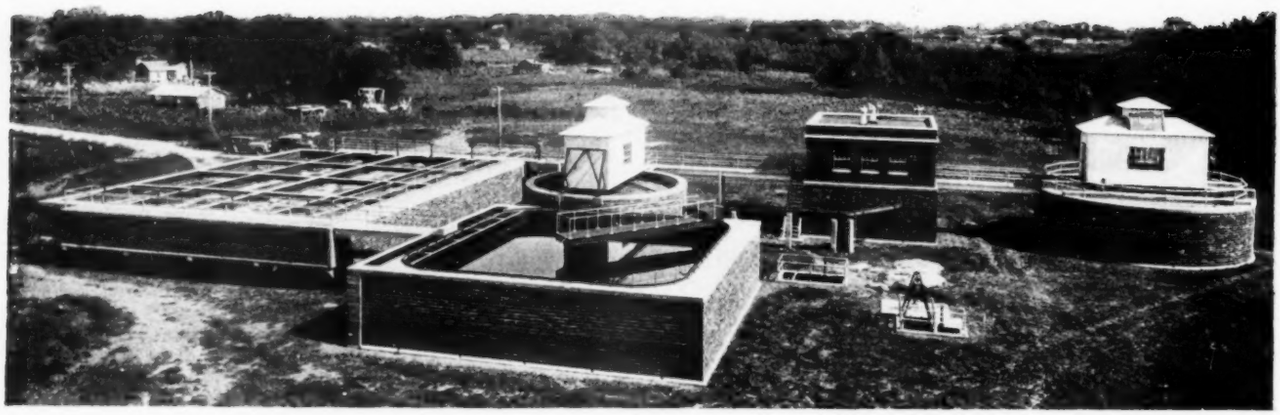
One permanent objective, realization of which must be worked for in every community, is effective control of preventable disease, and sound health for all the people. The first necessity to obtain this objective, as stated in a recent pledge of the American Public Health Association, is:

A full-time health service with trained personnel for every community, and provision of adequate public funds for its support.

The first fruits of such organization and support of public health knowledge and resources will be:

1. Reduction of the maternal mortality rates, so that the United States and Canada will be second to no nation in the safety of motherhood.
2. Securing normal growth of body and mind for children, and their training in the laws and personal practices of a healthy life.
3. Protection of life and limb and promotion of health for the working man and woman.
4. An adequate supply of safe milk for every community.
5. An adequate supply of pure water for every community.
6. Elimination of tuberculosis, malaria, hook-worm disease, typhoid fever, diphtheria and smallpox, among the communicable diseases of which we have sufficient knowledge.

In issuing this statement, The American Public Health Association pledges to the health of workers of the country and to the people of our member nations vigorous cooperation in carrying these projects to a successful conclusion.



THE NEW $100,000 PLANT AT OTTAWA, KANS.

A Concise Story of a Compact Sewage Treatment Plant

TWO types of plants were considered for the new sewage treatment plant at Ottawa, Kans.—the sprinkler filter type and the activated sludge type. The activated sludge type was selected for several reasons, principally as follows: less odor nuisance; and greater freedom from danger of flood damage. The operating costs are greater for the activated sludge type, mainly on account of the power required to aerate the liquid sewage by means of compressed air, but since the power is purchased from the city's own electric plant, this extra cost is not a large item.

The pump-pit contains three lift pumps, located 30 feet below the ground level, to elevate the sewage to the preliminary settling tank, from which the liquids flow to the aerator and the settled solids are pumped at intervals to the digester, where they remain for a period of several months, until they are completely decomposed and ready to be discharged at intervals on the sludge drying area. The dried sludge will be hauled away and sold for fertilizer.

As the liquid sewage passes to the aerator, a portion of the activated sludge from the final settling tank is mixed with it, and this activated sludge, together with the oxygen and the violent agitation provided by the supply of compressed air introduced through Filtros plates at the bottom of the tanks, rapidly clarifies the sewage through the action of bacteria just the same as it is accomplished by nature in a slower manner.

Settling Tanks and Sludge Clarifier

From the aerator, the liquid sewage with the activated sludge passes to the final settling tank, where the sludge settles out, aided by a Dorr traction clarifier, and is pumped to a division box, located in the blower house, by means of which the correct proportion may be returned to the aerator and the balance diverted to the digester.

The preliminary settling tank is 30 feet in diameter and 14 feet deep. It is equipped with a Dorr central drive clarifier with slanting blades revolving over the floor of the tank to pass the solids to a hopper at the center, from which they are pumped to the digester.

The aerator is 66 feet by 59 feet, with partition walls dividing it into four compartments. It is 16 feet deep, with floor 5 feet 3 inches below the ground level.

The final settling tank is 40 feet square and the average depth is about 14 feet. The Dorr clarifier with which this tank is equipped is of the traction type, operated by a motor and gearing mechanism traveling on a rail around the top of the tank.

Sludge Digestion Tank

The digester is a round tank 30 feet in diameter and 20 feet 3 inches deep, with floor 10 feet below ground level. It is provided with Dorr equipment to slowly stir the contents and break up the scum which accumulates at the top. The tank is covered with a concrete roof and is provided with apparatus to collect gas formed during the digestion process. This gas is burned in a boiler and heats water which is circulated through coils in the digester in order to keep the temperature of the decomposing solids at the most favorable point.

The tops of the tanks and walkways are 17 inches, and the floor of the blower-house 23 inches above the level of the 1929 flood. The plant was designed by Black and Veatch, consulting engineers, of Kansas City, Mo.

AERIAL PHOTOGRAPHY AIDS FLOOD CONTROL WORK NEAR MISSISSIPPI RIVER CITIES

PHOTOGRAPHIC mapping by means of airplanes, which has been of value to many cities in city planning and tax assessment work, is performing an important function in the prosecution of the government flood-control program in the Mississippi Valley. Last year the photographic division of the Curtiss-Wright Flying Service made an 8,500-square-mile aerial survey for Colonel F. B. Wilby, United States Engineers' Office, Memphis, Tenn., and has recently been given a contract for approximately 9,000 square miles lying between the White River and the Mississippi, from 17 miles north of Cairo to 68 miles south of Memphis. The photographs will be on a scale of about 1 inch to 1,500 feet; 14,000 separate exposures will be required, and 50,000 miles of flying.

This aerial survey, as a preliminary to a vast engineering enterprise that will assist materially in the employment situation, is to be rapidly consummated; half of it is to be finished in two months, and the entire survey in five months.

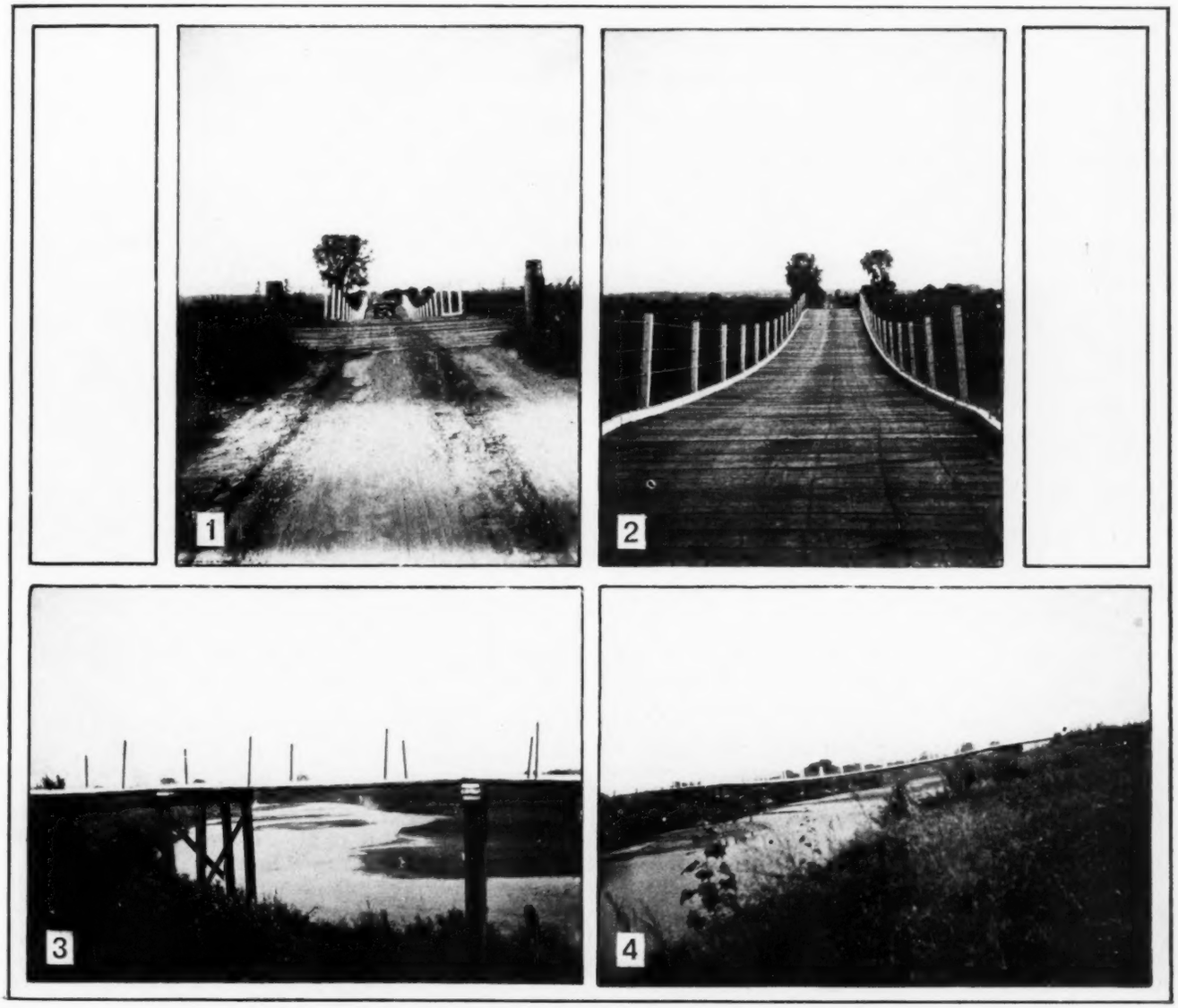
Good Service from a 160-Foot Span Temporary Cable Bridge

By **W. P. NORRIS**
County Engineer, Page County, Iowa

OWING to flood losses that the southwestern part of Iowa has suffered in the last few years, it has been impossible to replace destroyed structures out of current revenue. On several roads, unimportant from a traffic standpoint, it was not considered advisable to replace bridges with permanent structures until funds were in better condition. However, from a local standpoint, these highways were very important, although not carrying a heavy traffic. In many cases the roads were the only outlet for a considerable portion of the county.

Handling the Cables

The cable bridge we constructed consists of six 1-inch cables fastened to piling driven in the ground. The piling is back-anchored to a tieback consisting of piling laid at right angles to the bridge and buried at least 10 feet in the ground. To prevent cables from cutting into the piling, iron collars made from a piece of automobile frame are bent around the piling. The piling at each corner of the bridge is not driven flush with the ground, but left about 4 feet high, and the cable hand rail is fastened to it. The tieback anchor is fastened to the piling by the use of four 1½-inch cables and is drawn taut so that the end of the piling cannot be pulled towards the span and cause the cables in the bridge to slacken. The main cables are fastened to the piling by being placed around it in an iron collar and fastened by means of clamps. At one end of the bridge the cables are cut between the span and the



VIEWS OF PAGE COUNTY'S TEMPORARY SUSPENSION BRIDGE
1. Approach to the bridge. 2. End view of the bridge, showing the hand rail and flooring. 3. The pile bent at the edge of the water. 4. The complete span

piling and a ½-inch turnbuckle is inserted so that the cable can be tightened. After the cables are brought to the proper tension, a piece of cable is clamped to the main cable at each end of the turnbuckle to afford a factor of safety in case the turnbuckle should break.

At the edge of the stream, a pile bent is set with a cap. The cables are not fastened to the bent but are simply laid on the cap. The reason for setting this bent is to afford a means to level up the floor of the span.

Flooring

The floor consists of 3 x 12 x 14-inch full-sawn fir laid directly on the cables. This is attached to the two outside cables by means of a hooked bolt which hooks around the cable and goes through the floor plank and fellow guard. The other four cables in the bridge are not fastened to the floor planks, but the planks are supported by all six cables, as the planks are laid directly on the cables.

On each end of the floor, a 3 x 12 plank is laid lengthwise of the bridge; also a 4 x 4 is laid on top of this and fastened to the cable by hook bolts. The guard-rail consists of 4 x 4 posts, 4 feet in length fastened to the fellow guard by a stirrup and bolts; and ½-inch cables are threaded through the posts to form the guard-rail proper.

Speed of Erection and Economy

A bridge as described above can be built very quickly and can be used by all except the very heaviest traffic. In case of the failure of a permanent bridge, one of this type can be constructed at once to relieve traffic conditions and open the highway. This type of bridge can be built where funds are limited and can be used until sufficient funds are available to construct a permanent structure.

Costs

The cost of this particular structure, complete, was $2,231, and it was built by a foreman and five men in eight working days of ten hours each. It was built one mile north of the city of Shenandoah, Iowa, a city of 6,000 people, located in the southwestern part of the state of Iowa. This city has a great number of visitors, due to two large radio stations located there, and at the time this structure was built, there was no means of egress from the city to the west without a ten-mile detour. During the rebuilding of a river span on the primary road west of Shenandoah, for approximately six weeks, all traffic used this structure, and a traffic census showed that 520 cars per day crossed this bridge. The only noticeable effect was that the plank in the floor wore out very rapidly and had to be replaced in about three months.

New Jersey Adopts Traffic Signal Code

THE New Jersey Traffic Commission, in order "to inform municipal officials of the engineering principles controlling the successful installation and operation of traffic control signals" and "to set forth the uniform standards and practices which the Commission will require for the approval of any traffic control installation," has formally adopted Code No. 1: "For Traffic Control Signal Installation and Operation."

The code is based upon special engineering principles; upon the "Report of the American Engineering Council Committee on Street Traffic Signs, Signals, and Markings," and upon requirements as set forth in the Traffic Act, Chapter 281, Laws of 1928, State of New Jersey. One of its important provisions is that (under Article 2, Section 3) signals may be installed and operated only when and during such times as one or more of the following conditions exist—conditions to be established by traffic counts and such other information as the Commission's printed form of application requests:

"a. *Where Vehicular Volume Warrants.*—The average vehicular volume warranting signaling, installation and operation is described as follows:

"The total vehicular volume entering the intersection from the combined major and minor street or streets must average 1,000 vehicles per hour for a period of 16 hours; of this total volume, 25 per cent must enter the intersection from the minor street or streets.

"b. *Where Pedestrian Volume Warrants.*—The pedestrian and vehicular volume warranting signal installation and operation crossing the major and minor streets must equal or exceed the rate of 250 pedestrians per hour in addition to vehicular volume as set forth in Section 3a.

[Special provisions are introduced covering intersections where the pedestrian volume equals or exceeds the rate of 250 pedestrians per hour, and the vehicular volume falls below the requirements.]

"c. *Where Coordination Requires.*"—This section provides that a traffic control installation which cannot be justified under the foregoing provisions may be justified as a part of a coordinated signal system, provided that a majority of the signaled intersections composing the coordinated system comply with one or more of the said conditions and that the installation proposed adds to the efficiency of the system.

A note to this section makes the following provision: "Coordinated control as described herein occasionally necessitates, for a balanced operation of the system, the installation of control units at lightly traveled intersections. Where such conditions exist, an installation may be warranted as an improvement to the coordinated system, even though conditions at the particular intersection might not otherwise justify regulation."

"d. *Where Other Conditions May Warrant.*"—This provision is designed to cover such occasional conditions as excessive speeding endangering pedestrians and vehicular movements, and, where desirable, to separate continuous flows of traffic into groups even in the absence of an otherwise necessary volume of traffic.

"e. *Where Conditions Warrant Actuated Control.*"—Provision is here made for irregular intersections, or control locations with special characteristics in consideration of which the foregoing regulations may be waived."

Article II, above quoted, is entitled "Standards of Utility." The Code contains also articles covering Standards of Design, Standards of Installation, and Standards of Operation.

The present Code has been modeled after one now in effect in Massachusetts (discussed in this journal November, 1929, page 90), an indebtedness acknowledged in the printed document. It is interesting to note, however, that the Standards of Utility differ in the two Codes. In Massachusetts, "where installations are to be justified solely by vehicular volume, there *must be at least* 500 *vehicles* entering the intersection per hour"; and 25 per cent must be upon the cross-street. The Massachusetts code states that "this figure is strictly minimum and is not to be taken as a condition for which the Department would recommend installation. It is merely used to prevent installation which would be of a detrimental character, until such time as the engineering studies now under way may be completed, and a scientific basis for volume requirements established."

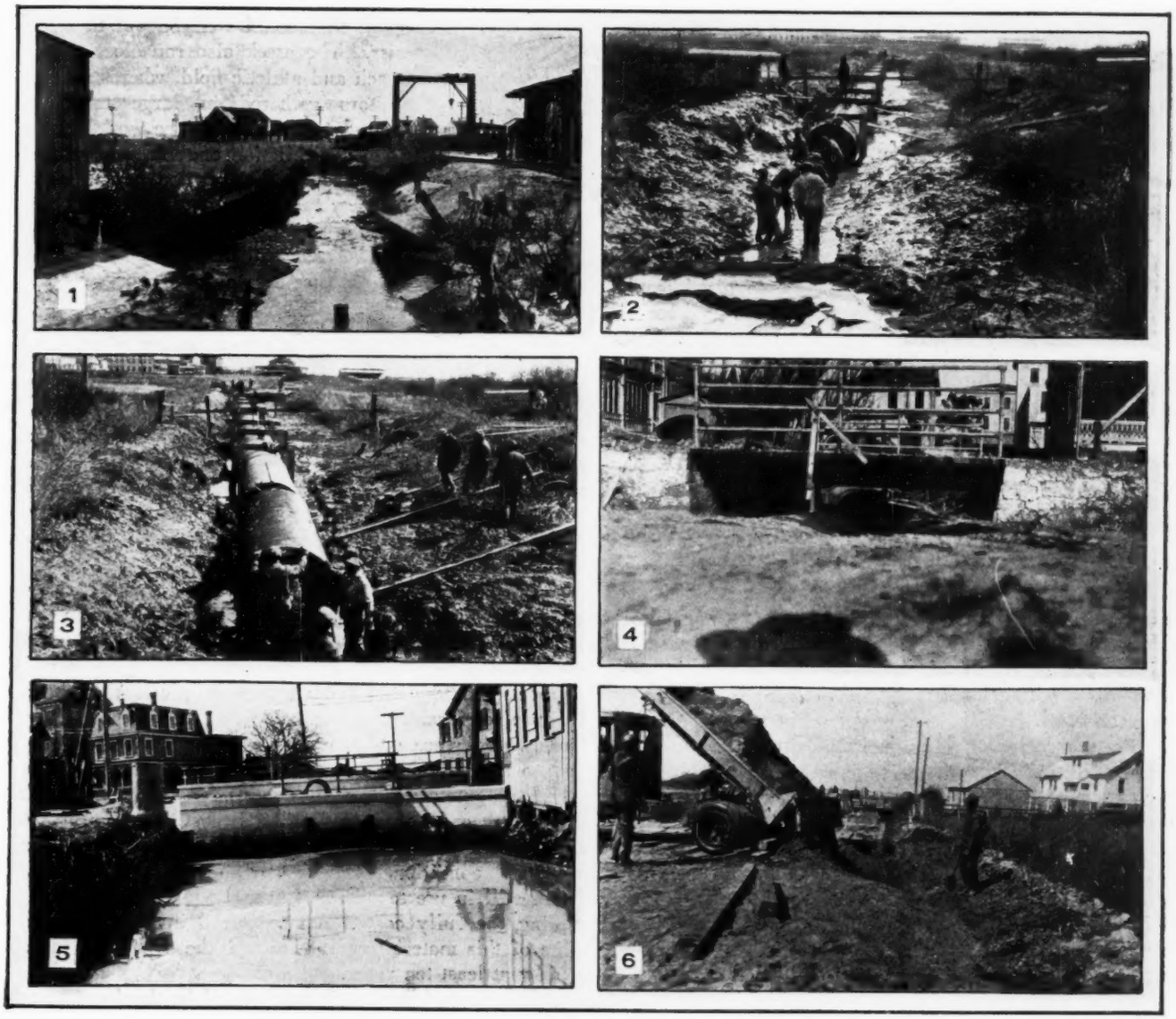
Appointment of the State Traffic Commission by the Governor of New Jersey, and its duties and authority, are described in THE AMERICAN CITY, June, 1930, page 102. Code No. 1 is obtainable from the Commission's office in Trenton.

Enclosing Offensive Open Stream Increases the Attractiveness of Popular Summer Resort

By L. E. MILLER, JR.
City Engineer, Cape May, N. J.

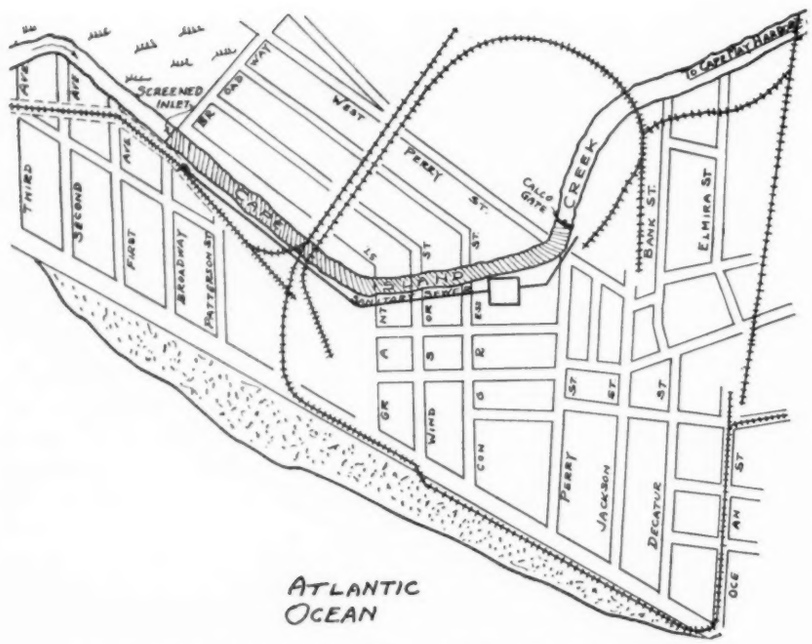
CAPE MAY has recently carried out a program of civic improvements which will add greatly to its growing popularity as a summer resort. The methods and construction used in successfully completing these improvements, which center around the installation of a sanitary sewer system and the enclosure of Cape Island Creek, are both of interest and value to cities contemplating work of a similar nature.

Cape May is situated on the Atlantic coast at the southern extremity of New Jersey. Bordered as it is on the east by the Atlantic Ocean and on the west by Delaware Bay, it possesses many natural advantages as a summer resort, among them the fact that it is one of the two places in the United States where the sun both rises and sets in the sea. Being a resort city, it has a large vacation-time population, but a comparatively smaller population during the re-



PROGRESS PICTURES OF THE CAPE ISLAND CREEK ENCLOSURE AT CAPE MAY, N. J.

1. A typical scene along the stream before enclosure. 2. Water, which was present at all times, was taken care of by dams and pumping to permit hand excavation. 3. Light-weight construction made it possible to place the pipe by hand. Note the cross bars to hold the pipe in place. 4. The enclosure of the stream made possible the elimination of a number of small bridges. 5. A Calco gate at the outlet end of the pipe permits free outflow at low tide and prevents backflow at high tide. 6. Backfill of borrowed material removed all traces of the unsightly open stream



MAP OF CAPE MAY, N. J., SHOWING THE SECTION OF CAPE ISLAND CREEK WHICH WAS ENCLOSED

mainder of the year. It is upon these year-round citizens and property owners that the work of carrying out the improvements that would assure increased popularity and patronage of their city has fallen.

The need for such improvements was recognized keenly as early as five years ago, but the city at that time lacked the funds necessary to do the work. Then a City Manager was appointed who organized a city government that has carried out a well-balanced program of improvements. As a result, Cape May has today, in addition to the improvements mentioned above, a modern water works, a well-equipped fire department, a system of paved highways, and an efficient police force.

Sewage-laden Creek Unsightly

However, the most important of these improvements from the standpoint of improved appearance and bettered sanitary conditions is the enclosure of Cape Island Creek. This creek has its source in the marshes west of the city and its outlet in Cape May Harbor. In the past it was used as the main outlet for sewage from the western section of the city. Being open and passing through the western center of the city, it constituted a menace to the health of the inhabitants. At high tide it was always full, even back to its sources in the marshes. For this reason the swampy area through which it passed was always damp and served as a breeding-place for mosquitoes. Such a set of conditions can little be tolerated in any community, and least of all in a community such as Cape May, whose attractiveness serves as a drawing card for a host of visitors, from whom a large part of its income is derived.

Sewage Diverted from Creek

As a partial remedy for this condition, a sewer system which would provide another outlet for the city's sewage was planned early last year. Remington, Vosbury and Goff, consulting engineers, of Camden, N. J., were asked to consult with the City Engineer and make the necessary plans. After a preliminary survey, they recommended that a main be placed along the south bank of Cape Island Creek, with a sewage disposal plant near North and Congress Streets. In this way the sewage which added greatly to the offensiveness of the open stream would be diverted from the creek. These plans called for a cast iron main and vitrified tile laterals, both materials which had previously been used by the city. This entire system as planned was installed before the end of 1929.

While the system took care of the sewage which formerly emptied into the creek, it did not remove the open creek, which was especially offensive where it passed near the main business and residential districts, and occupied valuable space that could well be put to other uses. The creek also ran close to the beach and athletic field, where summer visitors gathered in large numbers. Therefore, to complete the work started by the installation of the sewerage system, it was decided to enclose that portion of the creek that lay between Broadway and Perry Streets, a distance of approximately 2,000 feet. Such measures would greatly improve the general appearance of the neighborhood and would in this manner enhance the value of properties adjoining the improvement.

Foundation Conditions and Finances Influence Selection of Pipe

When the type of material from which to effect the enclosure was considered, the heavy, rigid type of construction was automatically eliminated because soil conditions were of such an unstable nature that this type, for the size required, would necessitate a special foundation of piling and mudsills. This would increase the cost of the project to such a point as to make it prohibitive.

An alternate type of construction which was especially adapted to the conditions at hand was found in corrugated metal pipe. Because of its light weight and continuous construction, this type of pipe would require no special foundation and could be installed at a cost that made the project feasible.

However, since the proposed enclosure would be subject to partial salt-water conditions, the durability of the metal to be used was an important factor to be considered. Service records of corrugated pipe of pure iron show that there are instances of such pipe having served under salt-water conditions for a period of seventeen years and being still in use today. A further inquiry revealed that adding the fully coated Armco paved invert feature to pipe of this material would increase the expected service life by at least ten years.

On an annual cost basis as outlined by the Iowa State College Bulletin, No. 69, the cost per year of service of the four alternative types under consideration was computed to determine the most economical type. By this method it was found that the annual cost of the corrugated paved invert pipe would be $572 less than that of plain corrugated iron pipe, $2,816 less than cast

iron pipe, and $2,508 less than concrete pipe. Therefore, city officials showed no hesitancy in choosing corrugated paved invert pipe of 60-inch diameter, which was considered to be ample size to care for the flow of the creek. The costs above do not include the expense of backfilling, which had to be hauled from a borrow-pit and would be the same for all types.

Installing the Pipe

Installation was started at the downstream end. As planned, the line follows the natural course of the stream. The numerous bends which this plan required were provided for by building manholes to take up the angles. Although specially fabricated elbows could have been obtained for these bends, the manholes have the advantage of serving as ready outlets for future additions to the storm sewer system.

In laying the pipe, the natural grade of the stream was followed, with the flow line set at 6 inches below the bottom of the creek level. Water was always present, and it was necessary to take care of it before proceeding with the excavation. This was done by putting a bulkhead or dam across the creek about 60 feet ahead of the working point. Pumps were kept running at all times to keep the water down to the required level.

Since at places the space between buildings was too limited to allow room for a dragline, all of the excavation was done by hand. This amounted to a trench which averaged 18 inches deep and 5½ feet wide. For the most part, the material encountered was muck and silt plus a small amount of sandy material which formed the underlying stratum. Cost studies kept on a 158-foot section of the line showed that the amount excavated for this distance was 58 cubic yards, which was removed at the expenditure of 0.649 man-hours per linear foot.

With the exception of a few shorter sections necessary to piece out at the angles, the 60-inch pipe was delivered to the job in 18-foot sections. When a sufficient amount of excavation had been completed to lay one section, a length of pipe was rolled down the bank and into place. Because the bank of the ditch was free of stones and other sharp obstructions, it was possible to do this without any injury to the coating of the pipe.

Connections were made by bands of the single-strip type, five corrugations wide and equipped with angle-irons and three bolts for drawing them up to the required tightness. As the pipe is serving in partial salt-water conditions, it was thought well to coat the bolts after the bands were in place. The time required for placing the pipe was 0.131 man-hours per linear foot, and that for banding was 0.02 man-hours per foot.

Some trouble was experienced from the water which rose in the trench during the night when pumping was stopped and which tended to float the pipe out of position. To overcome this tendency, a cross-piece was nailed to stakes driven on each side of the pipe. One such set of stakes was found to be sufficient for a section of pipe.

Backfilling, all made with borrowed material, was under a separate contract and was carried on independently of the laying of the pipe. Special care was taken to tamp the fill thoroughly, because the strength of this type of pipe depends largely upon the side support given it by filling material. The backfill was carried up to the level of the surrounding terrain and when completed removed all traces of the once offensive Cape Island Creek.

Automatic Drainage Gate Prevents Tide Flow in Pipe

To prevent backflow into the line at high tide, the plans provided for a Calco automatic drainage gate at the outlet end of the pipe. This gate was installed at Perry Street and permits free outflow at low tide but effectively prevents backflow and the attendant flooding of the marshes at high tide. With this regular backflow stopped, the marshes will no longer serve as a breeding place for mosquitoes.

Another advantage of the installation was the elimination of a number of small bridges which were formerly needed to carry the various streets across the creek. The city is no longer confronted with the maintenance of these structures, and it is now possible to continue the full width of the street.

Eleven men and a foreman, working intermittently as conditions permitted, finished the placing of the pipe in ample time to prevent any delay to the completion of the rest of the project.

The Result

The enclosure of Cape Island Creek, as completed, is representative of the benefits to be gained from such an improvement and of the economies that accompany the choice of a construction material adapted to the conditions at hand. Cape May has made an investment in bettered sanitary conditions and an improved appearance which will undoubtedly pay large dividends in increased popularity as a resort for vacationists from nearby cities.

The entire program of improvements as outlined above was under the general direction of Paul A. Volcker, City Manager, with the writer in direct charge of construction. The contractor for the job was The Seaman and Letzkus Co., of Stone Harbor City, N. J.

More Than 56 Per Cent of Our Population Now Lives in Urban Areas

OF the population of the United States, 56.2 per cent lives in urban areas, as such areas are now defined by the Bureau of the Census, according to a statement based on the 1930 returns and made public by the Director of the Census on December 22. This compares with an urban population of 51.4 per cent, according to the 1920 census tabulation. Of the 1930 total of 122,775,046 persons, 68,955,521 are shown to live in urban territory, while 53,819,525 live in rural territory. Excerpts from the Census Bureau statement follow:

Urban population, as heretofore defined by the Census Bureau, has included all cities and other incorporated places having 2,500 inhabitants or more. For use in connection with the 1930 census the definition has been extended to include townships and other similar political subdivisions (not incorporated municipalities) that had a total population of 10,000 or more and a population density of 1,000 or more per square mile.

In three of the New England States, New Hampshire, Massachusetts, and Rhode Island, conditions are exceptional in that the compactly built portions of the towns (townships) are not separately incorporated or politically distinct in any way from the rural territory within the same town, nor is it the practice to incorporate even the large places as cities until they attain a population of 15,000 or 20,000. Consequently, if only the cities were counted in the urban population, the classification would be quite inadequate.

In 1920 and 1910 all towns in these states having a population of 2,500 or more were classified as urban. This resulted in including a considerable number of places that were mainly rural in their general characteristics. In 1930, the special rule for these states has been modified so as to place in the urban classification, in addition to the regularly incorporated cities, only those towns in which there is a village or thickly settled area having more than 2,500 inhabitants and comprising, either by itself or when combined with other villages within the same town, more than 50 per cent of the total population of the town.

The net result of the two changes described above is to increase the urban population of the United States as a whole by 284,708. In other words, if the classification had been made in 1930 on exactly the same basis as in 1920, the urban population would have been 68,670,813, instead of 68,955,521, and the percentage urban would have been 55.9 instead of 56.2. It is believed, however, that by reason of the changes introduced into the method of classification followed in 1930, the figures obtained represent more adequately the population living, respectively, under urban conditions and under rural conditions.

Projects and Performance

In Pictures and Paragraphs

Highway Improvements in St. Louis

Two concrete strips with an unpaved strip between, and a half highway-width bridge spanning a storm-water channel—the latter to be made full width when traffic demands; these are characteristics of the recently opened major highway illustrated at the right. It is paved full width for the stretch at the city limits which is to form a connection with a proposed county highway.

The grade-reduction project on Calvary Avenue (below) is the result of ten years of effort. The avenue, an old road between two large cemetery tracts, ran for over a half-mile on a high plateau, then dropped off to meet Broadway. Dedication of triangular parcels from both cemeteries has finally permitted diagonal side-hill roads on six per cent grades to replace the old "jump-off" which formerly ran straight down toward the white house.

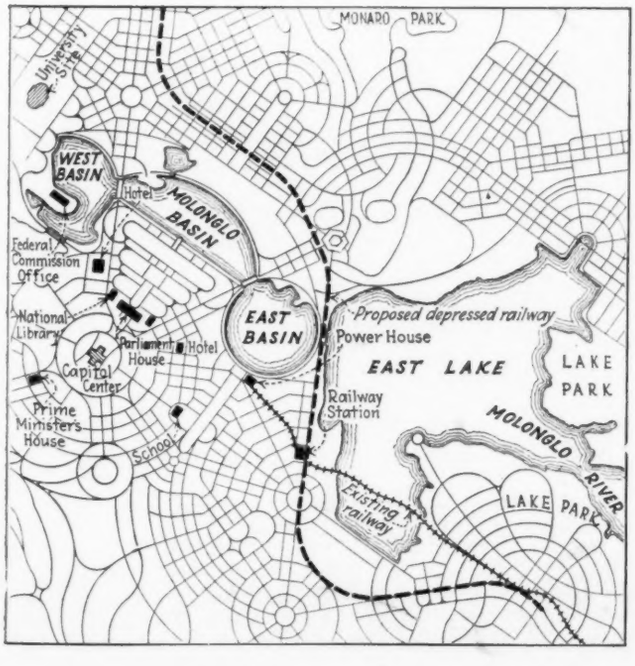
These improvements are under the direction of W. W. Horner, Chief Engineer, Division of Sewers and Paving, St. Louis, Mo.

Canberra
Capital of Australia

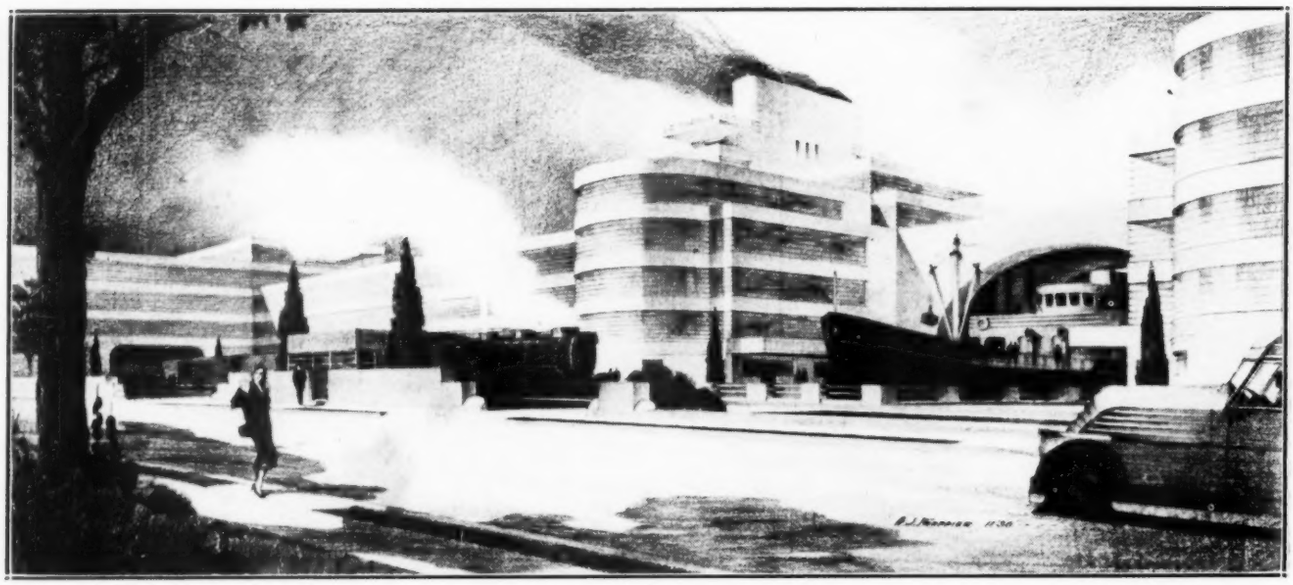
In 1921, the scene above was still open country. Today, it is the site of a developing federal city with a population of 6,000. Since May, 1927, it has been the seat of government of the Commonwealth of Australia. The residential section is in the foreground, the Capitol site in the middle distance.

GOVERNMENT POST OFFICE

PARLIAMENT BUILDING



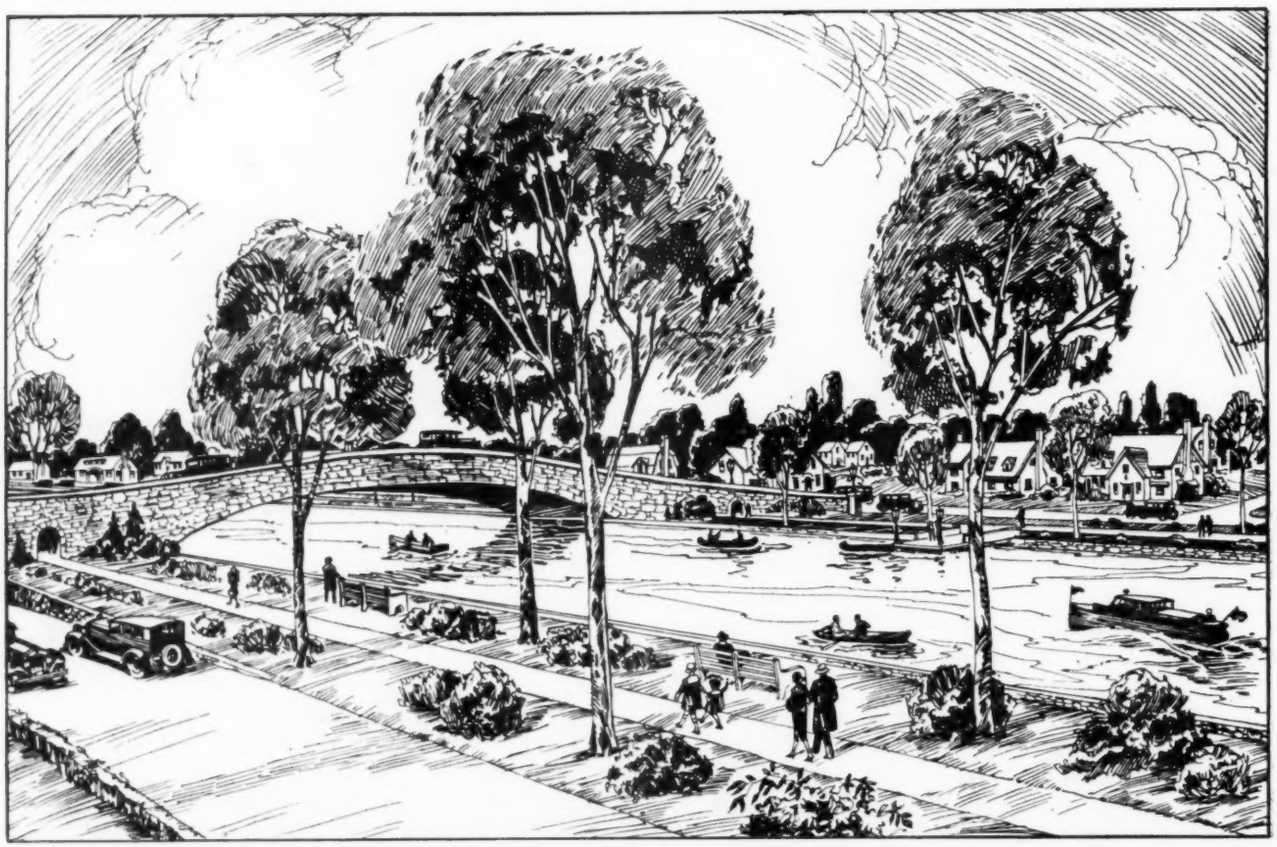
The city plan, made by an American planner, Walter Burley Griffin, of Chicago, was adopted before the World War. (See *The American City*, July, 1912, page 9, and June, 1927, page 769.) In carrying it out now, simpler buildings are being substituted for the monumental public structures first visualized. Views of two of the new buildings are here reproduced. These and the other illustrations on this page are from an article in *Engineering News-Record*, December 4, 1930, giving an account of developments to date, including local government, water, sewage disposal and transit facilities.

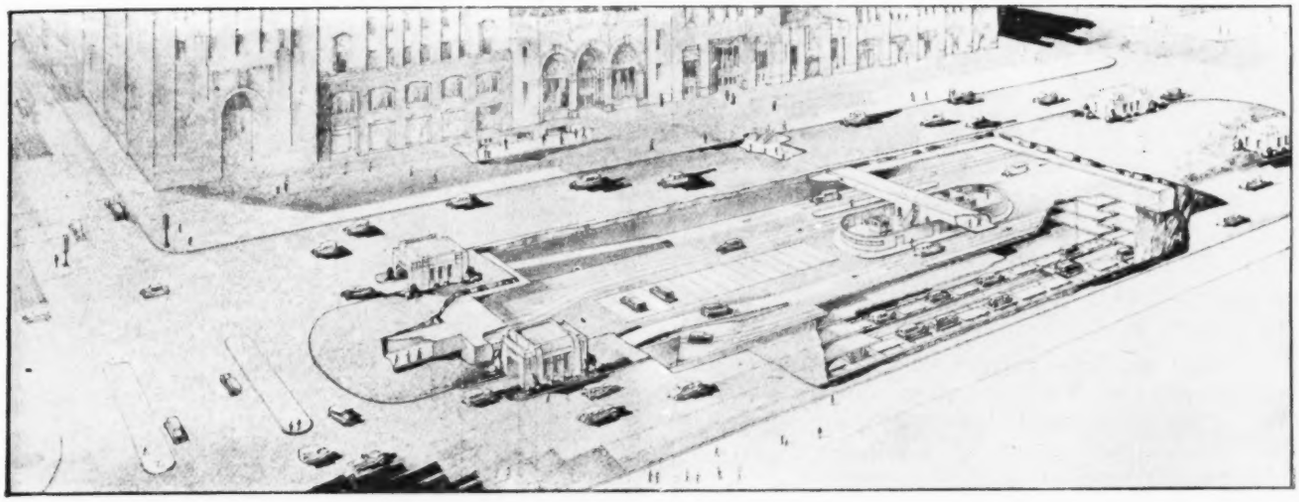


A Great, New, Self-Contained Industrial City Is Proposed

One of the chief proposals of the Regional Plan of New York and Its Environs is for a city built especially for heavy industries, and located on what is now the Hackensack Meadows, a vast swamp area in New Jersey, twice the size of Manhattan Island, and but three miles distant.

Factory, residential and recreational areas, and all types of transportation are correlated in the proposals (see The American City, July, 1928, page 120) for which schematic drawings have now been prepared. The one above suggests the industrial section with railroads, ships, and highways converging at its center. The one below is the artist's conception of a canal running through the residential area, and part of a system of canals and parkways.

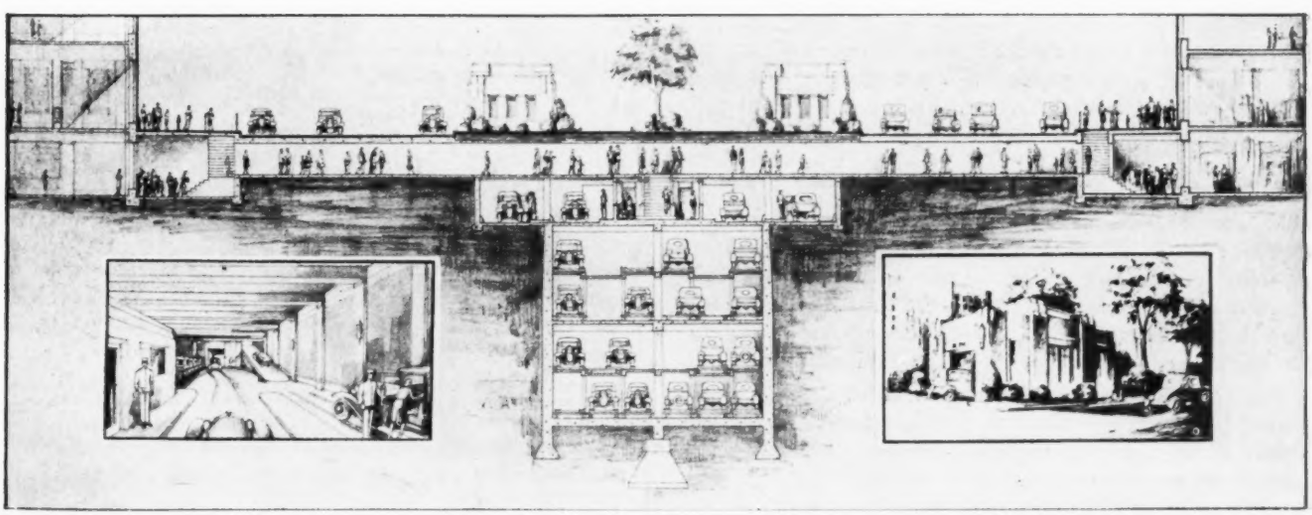




Shall Motor-Cars Be Parked Underground?

A method of parking automobiles from four to six stories deep, underground, has been proposed to the Detroit City Council as an aid toward solving the parking problem. Detroit has four downtown locations which, it is claimed, are particularly appropriate. They are Cadillac Square and Grand Circus Park, two fairly large open public areas; and Washington Boulevard and Madison Avenue, which are provided with central parkways. Cars would be driven down a ramp to a "reception floor, whence they would be taken by mechanical means to parking stalls. Entrances and exits would be so placed that the movement of cars in and out would be parallel to, and in the same direction as, that of traffic on the adjacent roadway.

Such a structure would not supplant other off-street parking facilities, but, conveniently located and easily accessible from the traffic stream, would commend itself to the short-time parker, and could offer charges attractive to him. It is estimated by Nolan S. Black and Wilfred V. Casgrain, the proponents of the plan, that one such unit for Cadillac Square, with spaces for 600 cars, would cost $1,500,000 equipped, and, with an average daily turn-over of 4½ cars per space and a rate schedule averaging 35 cents per car (probable minimum 20 cents), would earn nearly 6 per cent on the investment above operation, maintenance, depreciation of equipment, and sinking-fund payments to amortize the structure in 30 years. Use of the four locations in this way would provide between 3,000 and 4,500 additional parking spaces in the central business district—approximately as many as the curb parking spaces—facilitating the adoption and enforcement of more stringent parking regulations, and the relief of traffic congestion. The plan is also claimed to be applicable to more ordinary types of streets.



Electricity Boosts Suburban Maryland Over Drought Crisis

By A. O. WHITE

FOR thirty days the suburban communities in Maryland had been without sufficient water to use on lawns and shrubs, and the situation was getting more critical every day. There was plenty of water for nearby Washington, as the supply for that city is obtained from the Potomac River. Although the flow was nearly 1,000 cubic feet per second over Great Falls, only about one-third of this flow was required by the District of Columbia for water consumption purposes and for the hydro-electric plant. This meant that about 200,000,000 gallons per day were being used and some of the excess flow could be diverted to Maryland to relieve the situation there if provisions could be made for connections and pumping.

Connection Furnishes Emergency Supply

To relieve the water shortage in nearby Maryland, the Washington Surburban Sanitary Commission had been granted permission to connect its system to the District of Columbia pipe lines and about 1,500,000 gallons per day were flowing from the District fourth high service to the Maryland suburbs by gravity at three separate places. This, combined with the Burnt Mills Reservoir supply, gave these communities about one-third of the actual amount of water needed. It was evident that the reservoir would soon go dry with the prolonged drought, and that eventually Maryland would have to get all of its water from the District of Columbia or else curtail the use of water indefinitely, which would be a hardship to the homes where water was needed badly to protect the lawns and shrubs.

Installation to Be Made Permanent

The fact that a Warren duplex centrifugal pump equipped with a General Electric 125-horsepower, slip-ring, 2,300-volt, 3-phase, 60-cycle motor and control equipment would soon be available, was brought to the attention of the Sanitary Commission by a party of home owners in Leland, one of the affected Maryland suburbs. This pump had been in service for about six years, pumping about 5,000,000 gallons a day from the District of Columbia system to Arlington, Va., and was being replaced by a pump of larger capacity. The 5,000,000-gallon pump was designed for sufficient head and capacity to help considerably in the present crisis, and after investigation, the District of Columbia granted the Washington Sanitary Commission permission to install the equipment at Belt Road and Fessenden Street in the District of Columbia and to pump water from the third high reservoir into the fourth high system, which had been serving nearby Maryland for several days with a limited gravity flow.

On Saturday morning, August 9, three days after the matter had been presented to the Commission, work was started on the temporary pumping-station. The pump and electric equipment were delivered to the new plant, were set on a concrete foundation and connected. The Potomac

THE CENTRIFUGAL BOOSTER PUMP IN ITS TEMPORARY INSTALLATION, WHICH IS TO BECOME PERMANENT

Electric Power Co. had a 3-phase, 60-cycle, 4,000-volt line nearby. A bank of three 50-kva. General Electric transformers was installed to step the voltage down to 230, and then three 50-kva. transformers were used to step the voltage up from 230 to the 2,300 which was required for the pump motor. By working night and day, the pump was operated for the first time at 4 o'clock Monday afternoon, and on Saturday of the same week the Maryland suburbs were notified that they could use all the water desired for watering lawns and shrubs, and other purposes.

A Close Call

The installation was made at exactly the right time, as the Burnt Mills Reservoir Plant was forced to shut down at about the time the new pump was placed in service. The fact that a pump was available was a fortunate thing for nearby Maryland, for a new pump could not have been built and installed in less than fifteen weeks, and without a pump the water supply would have been limited indefinitely. This 5,000,000-gallon pump, combined with another 2,000,000-gallon pump which was also available, will furnish nearby Maryland with District water at a high pressure in sufficient quantity to provide for all requirements until the rains again fill the Burnt Mills Reservoir.

Installation to Be Made Permanent

Now that two pumps are in successful operation and other connections between the Maryland system and the District of Columbia lines have been made, it is understood that these connections will remain permanently so there will not be another shortage in suburban Maryland should the country be visited with a drought as serious as the one which has just been broken. No doubt the speed at which the pump was obtained and installed shows that the District is more than willing to cooperate in every way possible with the Washington Suburban Sanitary Commission.

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Finding and Using the Funds to Make City Planning Effective—I

By **COLEMAN WOODBURY**
Research Associate
in the Institute for Economic Research,
and Assistant Professor of Economics
at Northwestern University

IN view of its importance both to city planning and to municipal finance, this subject has received remarkably little consideration, mostly of a decidedly perfunctory nature. It is a subject rich with problems for research, but this short series of articles aims only at assembling a small part of the more easily reached facts and sketching the policies and lines of thought which seem to the writer at present to be the most promising. More adequate knowledge may change both the problems and the policies.

Neglected Pictures of Municipal Promised Lands

The era of indifference to these problems, however, is rapidly waning, chiefly because of two facts. First, the lack of application or "follow through" has become the curse of comprehensive city planning. Too often the architects' plans and sketches of the park improvement, the major street system, and the civic center, once so proudly displayed in the city hall, have become the neglected picture of the municipal "promised land." Unfortunately, no Moses has appeared, nor has the manna fallen from heaven.

The survey of planning activity in the United States described in the recent volume by Professor and Mrs. Hubbard ("Our Cities—Today and Tomorrow") covered, according to a statement in the Preface, "about 120 cities and 15 counties and regions in all parts of the United States . . ." Later on in the discussion we are told that "among the cities selected for this field study, there were at least 25 found in this active class," that is, with "comprehensive plans now in action." In other words, of the 120 cities surveyed—and presumably most of these were chosen because of some indication of planning or zoning activity—20.8 per cent were unmistakably carrying through their comprehensive plans. Probably the percentage for all "planned cities" would be much lower. In too many cities an apparent impasse has been reached: the officials and citizens realize that the construction of public improvements should be preceded by a city plan—but the plan, when prepared, has discouraged and balked the construction of all but a few minor improvements.

Many Leaps and Few Bounds

The second fact which is forcing consideration of ways and means of financing plans is the record of municipal expenditures and borrowings in recent years. Both have increased by leaps and bounds. According to the Federal Census Bureau the per capita expenditures in cities of 30,000 and over for operation and maintenance of government departments alone increased from $17.67 in 1913 to $42.44 in 1927; adding interest charges, the total per capita figures were in 1913 $20.82 and in 1927 $48.82. Net per capita indebtedness showed a very similar rise from $69.28 in 1913 to $134.27 in 1927.[1]

Making the necessary allowance for the change in price level, that is, the decline in the value of the dollar, shows during the 14-year period the following *percentage* increases in per capita figures: for operating expenses, 75.6 per cent; operating plus interest, 71.5 per cent; municipal indebtedness, 41.8 per cent. A small part of this increase may be due to extravagance and inefficiency; but undoubtedly the greater share is attributable to more and better services rendered by local governments as the size of cities has increased and the standards of urban life have risen. The automobile is directly and indirectly responsible for much of the change. The point in this connection, however, is that as these expenditures and debts have risen and in many cases press on the constitutional limitations imposed decades ago, the fate of city plan expenditures presented in mass and often in grandiose proportions has been most unhappy. City officials are often harried enough by the prospect of putting through one or two improvements for which the demand is urgent.

In light of these facts the suggestion may be made that *one of the most active groups in keeping down the costs of city plans should be the planners themselves and their backers.* Too often have they assumed the rôle or have been maneuvered into the position of the prodigal spender, the extravagant dreamer. Opposed to them have been the various tax reduction organizations, the professional watch-dogs, the hide-bound conservatives whose pinch-penny economy has too often prevailed. Of course, no one advocates that the friends of planning join this sect who seem to believe that the reduction of taxes is the ultimate good in governmental affairs. Rather they should *work for* and *secure publicity for* genuine economy, which looks not only at the size of the costs but at the amount of the benefits as well.

Does Grandiose City Planning *Discourage* and *Balk* Public Improvements?

Such is the case in many cities, according to Professor Woodbury. In this, the first instalment of his important article prepared especially for readers of The American City, he discusses certain essential elements of sound and progressive city plan financing. In subsequent issues of the article, which is based largely on a paper originally presented on October 30, 1930, at the Fourth Annual Conference of the Wisconsin City and Regional Planning Association, other phases of the subject will be presented, including Borrowing Policies, Long-Term Finance for the City Plan, and Benefit Assessments.

[1] Financial Statistics of Cities—1927, pp. 37 and 60.

The Plague of Over-Subdivision

A list of a few of the measures which are good planning and good public economy at the same time may clarify this statement. Reduction of the plague of over-subdivision comes first to mind. Over-subdivision means too often strained expenditures for streets and sewers, and later defaults in taxes and special assessments. In some cases the defaulted assessment bonds have to be backed by the city or its credit is harmed and future loans have to be made on less favorable terms. Elizabeth, N. J., has been a notable if extreme example of the working of this policy of over-expansion. Another evil of over-subdivision is that it forces street and park planning either to advance with it and risk the mistakes of planning too far into the future or to stay behind and accept later a poorly laid-out, half-improved district which is too far advanced to secure the full benefits of planning.

Current subdivision regulations have improved somewhat the *quality* of most subdivisions. The *quantity* of lots, however, has been almost untouched. Various proposals for requiring installation of improvements or a sufficient bond; for grading subdivisions, as securities are graded in blue-sky laws; for requiring approval similar to a "certificate of convenience and necessity" before lots may be recorded for sale, should be carefully examined. The platting of new sections is at low ebb at present, but the rate of absorption of lots already platted has been slowed up by the rapid gain of apartment houses in the new residential construction of the last eight or ten years. The time to prevent future floods is now.

Economy in Street Widening

A second economy measure which has a notable record in Kenosha, Wis., and elsewhere, is the voluntary setback, and in some cases the dedication of land for street widenings. This procedure not only saves the city large sums of money over a period of years, but is often to the interest of the landowners as well, because it brings nearer the date of completing the projected street widening or other improvement. A frank presentation of this fact has been most effective in cities which have realized the possibilities of this method. Care should be taken, however, to see that the landowner understands the procedure and his rights and is not in any way tricked nor bullied into assenting to set back his building or to dedicate land. Such tactics would work hardships on the small landowner and eventually would create suspicion and opposition to other planning projects.

Closely allied to this is the legal prevention of building in mapped streets either by the police power or the eminent domain method. The latter, which is advocated by the Committee on City Planning and Zoning of the Department of Commerce, would be more intelligible and more applicable by most city officials if the Committee would work out in some detail the methods of estimating the cost of the reservations for street purposes.

Coordination of authority for making all public improvements is a crying need. The planning commission should be the advisory committee for this responsible body. Overlapping districts for every conceivable purpose which require the spending of public money is one of the most unfortunate conditions encouraged by the present inflexible methods of limiting municipal debts. It diffuses responsibility for high expenditures, it facilitates "passing the buck," it discourages the conscientious citizen who tries to keep informed on municipal affairs, and too often it disgusts the voters, who will refuse sanction to all bond issues, regardless of their merits, merely to register disapproval of the whole system.

The Spectacular vs. the Humble

As a final measure of economy, all planning commissions and their staff advisors should weigh carefully the large, spectacular public improvement against the more humble features of planning: the civic center outlay against the neighborhood playground system; the elaborate grade separation against the residential street improvement. These, of course, are not mutually exclusive, but many cities have emphasized the first too much and neglected the second. Another unwise policy is the tendency of humble cities of medium size to copy the imposing public buildings of larger and wealthier towns. The result is poor economy and often an incongruous mass of buildings quite out of keeping with their setting. This article is not the place to go further into the balancing of these rather intangible values, but the issue is nevertheless one of real importance.

To Bond or Not to Bond

Vigorous but intelligent economy, then, is the first requirement in a program for city plan finance. The measures listed are only illustrative; they by no means exhaust the possibilities. The second major problem is the control of the bonded debt of municipalities. For what outlays should bonds be issued? Which ones should be taken care of out of current revenue?

Shortsightedness and satisfaction with superficial arguments have marked too many controversies concerning the relative merits of municipal borrowing and the so-called "pay-as-you-go" plan. One of the worst examples of this is the popular idea that borrowing reduces the present weight of the improvement to the amount of the interest plus the contribution to the sinking-fund, that is, from 100 per cent to, say, 7 per cent. This, of course, is true for any one improvement and as long as more and more bonds are issued. But as the issue of bonds has to be slowed down, sooner or later the real weight of interest and redemption charges is felt. In 1927 the Federal Census Bureau reported that estimated debt charges were 37.1 per cent of the expenditures for permanent improvements made by cities of 30,000 and over, and that for the period from 1903 to 1927 this percentage was 45.8.[2]

Pay As You Go?

Another thin argument is that since a heavy debt is admittedly bad for a city, the smaller the debt the better, and no debt is the ideal situation. This ignores one of the major virtues of all long-time credit agreements, namely, that they may make available for immediate use funds which can be easily dispensed with for the present by their owners. In other words, the economic surplus is turned to the production of desirable public services. To pass by this source of community development and to raise taxes instead, much of which represents not a surplus but a painful exaction, has no broad basis as a social policy. Furthermore, the pay-as-you-go policy, if strictly applied, in many cities means either the absence of major improvements or an erratic tax rate.

[2] Studensky—"Public Borrowing"—p. 70.

Speed Control Without a "Prima Facie" Rule

By **MILLER McCLINTOCK**

Director, Albert Russel Erskine Bureau for Street Traffic Research, Harvard University

HOW fast may automobiles be driven with safety? This question has long been recognized as one of the most difficult problems in highway regulation. In the hope that this situation may be clarified, the National Conference on Street and Highway Safety at Washington has promulgated a new basis for speed regulation. The new rule was formulated after a careful consideration of the methods which have been used in the several states. These may be summarized as follows:

So-called fixed speed limits were the earliest used in highway regulation and are still retained in several states, though they are generally considered obsolete. This method provides that speed in excess of the limits set is conclusive ground for conviction. The chief fault with this method lies in the fact that the application of the rule results in arbitrary and inflexible enforcement.

Driving conditions are so varied that it is quite impossible to set fixed rates of speed which can be equitably and safely applied. For the more favorable conditions they are of necessity too low, and for the less favorable conditions they are invariably too high.

No single factor in highway regulation has resulted in so much bad feeling between the driving public and the agencies of enforcement than has this type of speed control.

Realizing the inequity of fixed limits, many states have attempted to soften the arbitrary results by adding the so-called prima facie clause. The speed limits are retained, but provision is made that an operator who is apprehended for exceeding the limit is not conclusively guilty, but only prima facie guilty, and that he may introduce evidence showing that under the conditions he was not driving in fact in a dangerous manner. In this form the rule is most generally used at the present time.

Theoretically it remedies many of the defects of the fixed-limit regulation, but in actual practice there is little difference, for the courts are customarily unwilling to look favorably upon such refutatory evidence even though the operator has time or desire to contest the case.

A number of states, having tried both the fixed limit and the prima facie rule with poor success, decided to abolish speed limits entirely and base their control on the requirement that operators should at all times drive at a reasonable and proper speed. Among these states are Connecticut, Michigan, Indiana and Kansas.

Speed Limits Which Fail to Limit

It is generally known among competent observers that speed limits have negligible effect upon the speed at which vehicles are operated. Drivers operate at that speed which appears to them to be safe and desirable under the circumstances. Periodical "drives" by motorcycle officers may temporarily affect this situation, but not for long.

Recently the Albert Russel Erskine Bureau of Harvard University conducted investigations in several states having fixed limits, prima facie limits, and no limits. Under comparable traffic conditions the average highway speeds were approximately the same in all states.

After reviewing current practice, the National Conference on Street and Highway Safety determined that no one

IF YOU GO 30 AND BUST SOMETHING YOU'RE UNCONSTITUTIONAL BECAUSE THE LIMIT IS 20 PRIMA FACIE AND THAT STUFF
HOW DO I PRIME MY FACE?

A STRAIN ON THE MENTALITY OF OFFICER AND MOTORIST
The prima facie clause of the new Detroit speed ordinance, in operation, as seen by the cartoonist of the *Detroit News*

of the present rules was satisfactory, and that modern highway conditions demanded a new policy. Fixed and prima facie rules were discarded because of their inaccurate and inflexible quality. The abolition of all speed limits was not approved, for it was felt that the practice left no guide for operators or for enforcing-officers. In the new rule, therefore, there was an attempt to combine the good qualities of present practice and eliminate the evil.

The Provisions of the New Standard Speed Law,

proposed by the National Conference on Street and Highway Safety were outlined in The American City for July, 1930 (page 83). In advance of the convening of the 44th State Legislatures which are to meet in 1931, the Conference has just issued (Dec. 13, 1930) the accompanying article by Dr. McClintock. This fresh discussion of the mooted questions of fixed speed limits and of speeds safe and reasonable under existing conditions, will be of interest, it is believed, even to readers already familiar with the provisions of the proposed new standard speed law.

The rule as promulgated by the Conference is in two parts. Part one, which is called the basic rule, prohibits (a) driving a vehicle "at a speed which is greater than is reasonable and proper," or (b) which is greater than will permit the operator "to decrease speed or stop as may be necessary to avoid colliding with any person, vehicle, or conveyance."

When the Driver Is Subject to Conviction

Thus an operator is subject even though driving at a speed of five or ten miles an hour if under the conditions such action is in fact unreasonable or improper or results in collision. A conviction for violation of the provisions of the basic rule carries the normal penalties provided for general regulations. Technically, the basic rules accurately followed and enforced would be entirely adequate for the control of speed.

As a practical guide for such obedience and enforcement, a second part of the rule is set forth under the title "application of indicated speeds." This part indicates speeds of 15 miles per hour near schools and under similar conditions, 20 miles per hour in business districts and other special locations, 25 miles per hour in residence districts and other specified locations, and 45 miles per hour in the open country.

These are not speed limits. An operator is not subject to conviction merely for having exceeded the indicated limits. Thus, on an open highway under favorable conditions where there is no violation of the basic rule, a driver may operate at 50 or even 60 miles per hour. In other words, speed per se is not made an offense.

It is, however, used as a measure of the degree of any offense which may be called bad driving. This is the provision which makes the new speed regulation the most severe which has ever been enacted against reckless drivers. Any operator who while moving at a rate in excess of the indicated speed violates the basic rule by driving in an unreasonable or improper manner, or so as to collide with any person or vehicle, or who violates any rule of the road, as, for example, driving on the wrong side of the road, cutting in, violating right-of-way or similar acts, is subject to the same penalty as that provided for reckless driving.

This begins with a minimum of $25 fine or five days imprisonment or both, and has a maximum for a second offense of $1,000 fine and six months imprisonment or both. The application of the rule will divert attention from merely technical rates of speed to actions which combined with speed result in hazards.

Abolishing the Game of Hide-and-Seek

Heretofore, highway driving has too frequently been a game of hide-and-seek between drivers and officers. The officer watched his speedometer, and the operator his rear-vision mirror. Under the new rule both will be watching manner of driving. The operator will know that he must drive slowly where conditions are unfavorable, but that he may legally drive rapidly under favorable conditions and in strict compliance with the laws of the road.

The new speed regulation of the National Conference on Street and Highway Safety may appear to be an innovation, but in fact it is merely a formal crystallization of the practice followed by intelligent operators for many years, and likewise by progressive and intelligent police departments.

The great advance is to be found in the fact that in the future those who depart from the rules will be subjected to very heavy penalties. Enforcement energies can now be concentrated on the really reckless drivers with the assurance that the punishment will fit their misdeeds.

Speed Restrictions in Kansas City and in Detroit

KANSAS CITY during the last weeks of December became the country's pioneer municipality in adopting the Conference speed regulation, certain aspects of which are above discussed. These are embodied in a new ordinance prepared for the city by the Erskine Bureau.

The newly amended speed regulations in Detroit, one of the confusing effects of which is illustrated in the cartoon on page 137, now reads:

"Section 14-A: Any person driving a vehicle on a highway shall drive the same at a careful and prudent speed not greater than nor less than is reasonable and proper, having due regard to the traffic surface and width of the highway and of any other conditions then existing, and no person shall drive any vehicle upon a highway at a speed greater than will permit him to bring it to a stop within the assured clear distance ahead.

"b: Subject to the provisions of subdivision (a) of this section and except in those instances where a lower speed is specified in this ordinance, it shall be prima facie lawful for the driver of the vehicle to drive the same at a speed not exceeding the following, but in any case when such speed would be unsafe, it shall not be lawful:

"Fifteen miles an hour on all highways in a business district.

"Twenty miles an hour on all highways in a residence district and in public parks unless a different speed is fixed and duly posted.

"It shall be prima facie unlawful for any person to exceed any of the foregoing speed limitations.

"It shall be the duty of every police officer to forthwith stop and make complaint against every person operating a motor vehicle on any highway in the city at a speed greater than 30 miles per hour."

Cook County Provides Safe Swimming

By CHARLES G. SAUERS
General Superintendent, Cook County Forest Preserve District

SOME of the hundreds of thousands of annual visitors to the 32,000-acre playgrounds of Cook County, Ill. —the Forest Preserve District— have always insisted upon the privilege of swimming, though 105 of the 110 miles of natural stream course within the system are polluted and will remain so for at least ten years till an extensive sewer construction program can be put into effect. The result has been always-impending epidemics of typhoid fever and skin diseases during the bathing season.

Cermak Pool, a large, up-to-date swimming plant located in the midwest part of the country, where natural water pollution is at its height, and likewise in a section selected for its easy accessibility to the largest part of the county population, is the solution to the problem arrived at by the Forest Preserve District officials. Absolute control of water purity, and a maximum of convenience and safety for bathers were the chief requisites of the plant.

The architect was charged with the responsibility of providing for the bath-house a design and materials such as pioneer craftsmen would have employed on the same spot a hundred years ago. Stone and timber have been used. The roof of the main structure is of split shingles. The pool proper is of heavily reinforced concrete, with ample pool walks, and the service buildings are of brick and field stone. It accommodates 25,000 swimmers at one time without undue crowding or congestion. The recirculation turnover is adequate to take care of twice this number.

The pool itself is 100 feet by 250 feet and has a capacity of 850,000 gallons. The depth under the diving boards is 11 feet, but the larger portion of the pool is wadeable water. The springboards, five in number, include a three-meter springboard and four one-meter boards and are all of recognized Olympic style.

Special provision was made to handle competitive events, and a 50-yard and also a 50-meter course are provided. The Amateur Athletic Union and the Amateur Athletic Federation both held their outdoor championships in it because it offers ideal competitive conditions. Local entertainments, meets and exhibitions were held at frequent intervals for the regular patrons. The "basket" method of handling the patrons' clothes is used and proved very satisfactory the past season.

Non-slip floors are provided for the bathers, not only in and around the pool but also throughout the entire plant, and in the season just finished not a single serious accident resulted from a fall. When one realizes that falls are the most common type of accident around the average pool, the results the first season show the wisdom of proper design in this respect. In addition to being non-slip, the floors are all properly drained and, incidentally, very easy to clean.

Rigid inspection of all bathers is insisted upon, and all are refused admission whose physical conditions do not warrant their being allowed to enter. A nude soap-and-warm-water shower is required, not just theoretically but actually, of all patrons. In addition, an automatic straddle shower with a deluge of water from every direction is placed at the entrance to the pool to rinse off any traces of soap which might remain. Visitors and spectators are not allowed in the pool area but are taken care of on a spacious balcony. Open or roll-over scum gutters of a special design which are easily cleaned and at all times exposed in the sunlight are another desirable feature.

The water purification system includes two electrically driven centrifugal pumps, double sterilizers, ample hair strainers, pressure filters of the horizontal type, filled with machine-cut quartz, flow indicators and suction cleaner, and a set of sprays so constructed as to make it possible

TWO VIEWS OF THE BATH-HOUSE
Above is the entrance side. At the right is the pool side. This view, as it appears from across the pool, is shown in the night lighted illustration on page 139

to create a "mill race" circulation of the entire contents of the pool or to spray the water in thin sheets to precipitate the heavy iron content and raise or lower the temperature as desired. The recirculation plant is of sufficient size to provide the complete turnover of the pool every eight hours.

The pool proved very popular and was kept open seven days in the week from 10 A.M. to 10 P.M. from the date of its completion until September 7. Night bathing, made possible by an effective battery of powerful floodlights, drew the patronage of a great many persons who were unable to swim during the day, and was very much worth while.

Swimming instruction was given to over 20,000 boys and girls under thirteen years of age by an efficient staff of instructors. A corps of guards was on hand at all times and was able to handle all situations without any conspicuous or dramatic rescues, the management insisting that only when swimmers were clearly unable to help themselves was any interference to be made, and then only in such a manner as to avoid the appearance of an accident.

A fee was charged for the use of the pool, namely, 25 cents to adults at all times, and 10 cents to children under twelve years of age, except three mornings of the week, when they were admitted free. This charge provided more than sufficient money to operate the pool and pay all maintenance costs. No suits or towels were rented.

EDITORIAL NOTE.—The following types of equipment were furnished for the pool:

Chlorinators	Wallace & Tiernan, Newark, N. J.
Pressure filters	Everson Filter Co., Chicago
Pumps	Dayton-Dowd Co., Quincy, Ill.
Installation of water-treating equipment	E. B. Kaiser Co., Chicago
Floodlights	Pyle National Co., Chicago
Ladders and railings	Newman Mfg. Co., Cincinnati
Pool accessories, springboard, etc.	Hill-Standard Co., Anderson, Ind.

Floor, walkways, etc., were built to specifications

"Policing" in the 90's, and Now

Crime-Control Methods Have Had to Respond to the Revolution in Crime Methods

THAT the crook of today is much smarter than was the hoodlum of 1900, and that modern efficiency has been nowhere more dramatically evident than in criminal circles during this century, were among matters emphasized by Chief of Police Joseph A. Gerk of St. Louis in a recent interview given the *Post-Dispatch* of that city on the 31st anniversary of his debut in police work. And "police methods have had to develop rapidly to keep pace with crime methods."

Then, a policeman had to be a big, tough, two-fisted fellow, who knew how to swing a club and to deal with crooks who fought with fists and bricks. He worked a 12-hour day, using the street car for distant emergency calls, while urgent calls close at hand were covered by squads in horse-drawn patrol wagons. The "bicycle squads" of the 80's and 90's had but recently been discontinued. The telephone service was miserable. As a consequence, the policeman frequently walked his prisoner to the station. If the prisoner was in no condition to walk, owing to over-indulgence in alcohol or to the policeman's fighting ability, he was frequently bundled into a two-wheel push-cart commandeered for the occasion and was jolted over cobblestone streets to the lockup.

"The old-fashioned helmet was *de rigeur* in those days, along with a cumbersome uniform coat heavily fitted with brass buttons, which made the policeman a first-class target and frequently enabled the criminal to beat him to the draw. Another conventional feature of police dress was the bushy mustache prescribed by the fashion of the day. Broad-toed shoes—still worn by walking policemen, were then the equipment of all hands, including headquarters detectives. Today the detective, particularly if he is one of the younger element, usually wears oxfords and silk hose and is in many cases as particular about his attire as a prosperous business man.

"Regulation of motor traffic—a whale of a job—the guarding of payrolls, furnishing of detective guards for wedding presents and valuable displays, and speech-making, are some of the functions of the modern police force not dreamed of by the force of the 80's. Speech-making has become a particularly necessary function for the chief of police. He is called upon to address civic organizations and church societies many times a month, and in my opinion is bound to accept the invitations because by each appearance he helps to build up the cooperation between the public and the police which is necessary to efficient operation."

The Chief of Police granted this interview "seated in his oak-paneled office with a battery of telephones, a radio receiver, a row of push-buttons and an electric enunciator before him." Placed beside that "young probationary patrolman on the St. Louis force" of 31 years ago, he would present the most dramatic element in his whole sharp-drawn study of *then* and *now*.

Bronze-Welding of Cast Iron Pipe

A Description of Methods Used Under Varying Conditions

THE extensive use of cast iron pipe for water distribution has focused the attention of water department engineers on bronze-welding as a new and effective method of obtaining satisfactory joints. Bronze-welded joints of the improved shear-V type, made under procedure control, will guarantee against leakage of the piping or joint-maintenance expense in the future.

The welding technique and organization for line construction is of interest to all connected with water piping projects, and the following procedure control includes recommended methods of bronze-welding cast iron pipe lines. The check of the welders, the selection and the inspection of material, the design and layout of the joints, and the preparation for welding, are all of vital importance in obtaining successful bronze-welds in cast iron pipe.

It is recommended that the maximum number of sections of cast iron pipe to be welded be six to eight, or from 72 to 96 feet of pipe. Expansion joints, or one of the various types of flexible pipe joints, should be used to join these longer sections.

Organization

The welding and construction organization will vary somewhat according to the length and location of the line, the time limit for completion, street traffic and other factors.

It is recommended that the pipe be purchased from the manufacturer with two, or possibly three, lengths bronze-welded together at the foundry. Only two or three field welds are then required to joint the 96-foot section, and the welding personnel is held to a minimum. One welder, with a couple of helpers for aligning the 24-foot sections, can joint 400 to 700 feet of 6-inch pipe in a day, sufficient to keep up with a ditcher and an ordinary laying crew. With larger pipe, the construction will of course be slower than with the smaller sizes of pipe.

Field Work

If the pipe is not supplied in double lengths, and the time is sufficient to warrant a detail organization, it is recommended that two lengths be bronze-welded together at the unloading point, or other convenient location, prior to stringing the sections of pipe along the right-of-way.

The pipe having been strung, the sections should be lined up for welding in accordance with the correct aligning procedure. If the trench has been opened, alignment should be made over it on skids.

One welder and one helper should be assigned to, and be responsible for, welding together a unit of from six to eight lengths over the ditch.

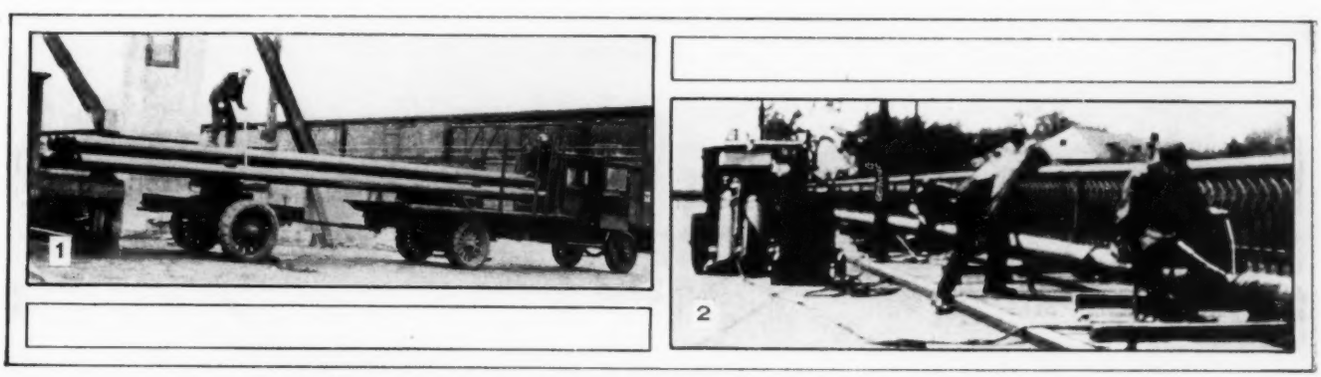
Two previously welded sections of two or more lengths each, welded either by the manufacturer or at the point of delivery, should be aligned, tacked and welded together, the pipe being rotated by the helper so that welding may be performed on the upper surface of the pipe. The sections so welded together should then be joined by tacking and welding to form a six- or eight-length welded section, as the requirement of the proposed line shall have determined.

If the supply of oxygen and acetylene is located approximately mid-length of the section, and 50 feet of hose is provided for conveying each gas to the blowpipe, loss of time in shifting the supply will be avoided.

Welding Procedure

After the pipe is in position for welding, carefully aligned and properly spaced, the joint should be made as follows:

1. Tack the joints in two or three places by playing the blowpipe over a small area of the V until a section is brought to a dull-red heat. The end of the rod having been heated during this process and dipped in the flux, apply the flux to the heated spot, and when, by touching the molten end of the bronze to the hot iron, it is found that the proper tinning temperature has been reached, a small puddle of bronze may be deposited to form the tack. This tack should be as small as possible and need only approximately fill the bottom V. Two similar tacks may be spaced about 120 degrees from the first one, the pipe being rotated and the alignment checked as necessary. If the joint is to be made immediately, and this is recommended, welding should be started at the point where the third tack would otherwise be placed.



TRANSPORTING LONG SECTIONS OF WELDED PIPE, AND WELDING ON A BRIDGE

1. A truck loaded with 32-foot double-length sections of 8-inch diameter cast iron pipe. 2. Two welders and a helper make up a 96-foot section on a bridge

2. Welding will be best accomplished if the puddle is started and maintained in the "near top quarter" of the circumference. Heat the pipe ends for some distance each way along the joint from the starting point, readjusting the flame if necessary during this operation, and finally concentrate on a section, bringing it to the welding or "tinning" heat, and having heated and fluxed the welding rod, apply the flux to this starting point. Bring the rod into the flame approximately in line with the joint. After the flux has been melted into a V, and spread with the rod and flame, the bronze may be applied, being careful to get thorough tinning at the bottom of the V and throughout the scarf. The initial puddle should be built up to fill the entire shear-V groove with a slight reinforcement built up above the surface of the pipe.

With the blowpipe held in such a way that the flame, after striking the puddle, reflects nearly tangent to the circumference, preheating the pipe some distance ahead, the puddle may be progressively moved forward, using the crescent shape oscillatory swing of the blowpipe and rod, characteristic of all ripple welding, the motion of the two being opposite to each other. The inner cone of the flame should be kept about ⅛- to ¼-inch away from the surface of the puddle, and sufficient flux should be frequently applied so that a layer of molten flux will precede the bronze. The V should be completely filled as the weld progresses, to avoid delay in going back to "touch up" previous work.

Precautions

As the puddle nears the top, the pipe should be rotated about 60 degrees, so that the welding may again progress upward toward a new top point. The proper welding speed will be indicated by the spread of the tinning film. Under no conditions should the bronze be run faster than tinning progresses.

Bronze should be deposited at the lowest temperature at which it will flow readily, since overheating will cause excessive fuming and produce inferior weld metal. The fumes of the zinc oxide should not be inhaled in large quantities and can be readily avoided by welder and helper.

As the weld progresses and tacks are reached, they should be melted out and flowed into the advancing puddle, the welder being careful that tinning is complete and of proper quality throughout the scarf. If welding is interrupted at any time and the puddle chills, care must be taken to make it molten again before any new bronze is added; otherwise weakness and leakage may result at the lap. If the pipe has completely chilled, a general reheating, as in starting the weld, is advisable before concentrating on puddling the already deposited bronze. In all cases, the last deposited bronze and the tinning film should be fluid when new rod is melted into the V.

When the joint is nearly completed and the puddle nears the already deposited bronze at the starting point, the first deposited bronze should be remelted for an inch or more and allowed to flow down into the advancing puddle. During this operation, as the puddle is advancing, sufficient bronze should be melted and fused in to completely fill the V as elsewhere. On the larger sizes of pipe, some extra heat should be applied two or three inches around and beyond the finishing point, so that any original cooling strains may be relieved.

Bronze melts at about 1650 degrees Fahrenheit, but at about 500 degrees Fahrenheit its strength is only about one-half that at ordinary temperatures, and strength diminishes rapidly with further temperature rise. High temperatures are therefore not necessary to permit sufficient yielding to relieve stress. For similar reasons, the joint should not be subjected to severe stresses until well cooled.

Slow cooling is advantageous in this as in most welding processes, and a sheet of asbestos paper laid or loosely clamped around the completed joint will reduce the cooling rate. In stormy weather, the joint should be protected before welding and afterward until cool.

Examples from Recent Jobs

A most interesting job involving the bronze-welding of cast iron water pipe was recently completed in the Middle West. A small town on the opposite side of the river from a large city was faced with the necessity of increasing its water-supply, and arranged with the larger city to tap its supply. It was decided to bring the supply across the river in a cast iron pipe line on the traffic bridge. The laying of this pipe line involved a number of difficult problems. The severe vibration caused by the traffic on the bridge increased the problem of joining the pipe. The heavy insulation which was required to protect the water from the varying temperature encountered in this exposed position, necessitated leakproof joints, as any leakage would damage the expensive insulation. Because of its ability to provide a solution for all of these problems, bronze-welding was specified.

In constructing the line, 16-foot lengths of 8-inch cast iron pipe were bronze-welded into long sections and these were joined by expansion couplings located near the expansion joints of the bridge, so that the expansion of the pipe line would be similar to that of the bridge. Expansion joints were used at other points, so that the bronze-welded sections did not exceed 100 feet in length. The bronze-welded joints were all of the shear-V type described. With this type of joint, it has been found that joints developing practically 100 per cent of the strength of the pipe may be obtained.

The pipe was obtained from the foundry already double-lengthed by bronze-welding before shipment, which made the handling and aligning of it an easier matter. The 32-foot lengths were unloaded from the cars onto a truck and trailer unit, which transported them to the job. Three wooden supports for each 32-foot length of pipe were blocked up on the sidewalk at the bridge to receive the pipe as it was unloaded from the truck.

Two welders were employed in joining three of the 32-foot lengths at a time into sections 96 feet long. As the welders progressed, a helper turned the sections of pipe so that the bronze was deposited near the top of the pipe at all times. The ideal position for bronze-welding is with the weld deposit progressing upward about 30 to 45 degrees from the top.

Each of the long welded sections was given a test before being coupled into the line. A small tank wagon supplied the water to fill the lengths for the hydrostatic test. The ends of the pipe were capped and a hydrostatic pressure test of 150 to 200 pounds per square inch was applied through a small hand pump. All the sections withstood the test without the slightest sign of leakage. The successful results obtained with this line are of interest, not only because of the bronze-welded cast iron pipe joints, but

DETAILS OF WELDING IN THE FIELD

1. Completing a bronze weld in a cast iron pipe. 2. A partially completed bronze weld, showing good tinning. 3. A close-up, showing the correct procedure. 4. This board covering prevented the ground from sagging as the pipe was jacked ahead through a tunnel. 5. A close-up of a bronze weld in a 36-inch diameter pipe

also because of the satisfactory results obtained by using 32-foot double lengths.

A public utility company in Missouri recently had to locate 150 feet of cast iron pipe under a railroad right-of-way. The railroad company under whose track the line was to go, would not permit the removal of the foundation under each set of tracks, so that the public utility company was forced to tunnel a pipe through, digging out the tunnel as the pipe was pushed ahead. This meant, of course, that a joint as permanent as the pipe would have to be obtained, because the development of any leak would practically mean the abandonment of the pipe line or its complete replacement.

With the advice and assistance of an oxy-acetylene service operator, the line was bronze-welded according to procedure control methods. Inasmuch as the pipe had already been obtained without the proper shear V bevel, it was necessary to prepare the proper bevel by means of a grinder. Cast iron pipe of 36-inch diameter was used. In lining-up the pipe, tack welds were made at six points around the pipe.

During all the welding, the weld section and the ends of the pipe were covered to retain sufficient heat in the pipe to avoid any possibility of local contraction. After each joint was completed, the pipe was shoved ahead and the joint covered with boards to prevent the ground from sagging.

It is evident from these experiences that the bronze-welding of cast iron water pipe in accordance with correct procedure control offers possibilities that merit the attention of water-works engineers and others using cast iron pipe.

Metropolitan Regions—
Chaos? Annexation? or Federation?

By **H. W. DODDS**
Editor, National Municipal Review

THE rapid growth of metropolitan regions has been one of the distinctive political phenomena of the twentieth century. Such areas consist usually of a large central city surrounded by suburbs. Although the region is a social and economic unit, it rarely falls under one political control.

As population overflowed into outlying districts, numerous small centers were developed which became incorporated as local units of government, and the political organization of the area lost even that harmony that we look for in a patchwork quilt.

City planning engineers were probably the first to realize the significance of metropolitan development. They quickly saw that matters of transportation, traffic, water supply, and sewage disposal paid little respect to local political boundaries. Today their activities have borne fruit in the regional planning movement, which ignores old municipal division lines as being frequently arbitrary and obsolete.

But statesmen and politicians did not grasp so quickly the inability of the existing congeries of independent units to provide decent government for vast interwoven interests. Business men were often aware of the economic waste arising from needless duplication of governmental overhead, but as a rule local self-pride, sometimes real and sometimes artificially stimulated, generally proved an effective barrier to thoroughgoing reform.

Why the Annexation Process Has Slowed Down

Before the day of rapid transit and automobiles, large cities were able to keep pace with the growth of suburban population by successive annexations of territory. But today outlying populations are not so readily absorbed by the central government. These communities now enjoy public works and governmental services which were before the exclusive possession of the large city. No longer is it necessary that a suburb be annexed to a city in order to enjoy a minimum of the modern conveniences of life. For this reason the annexation process has slowed down and this method of meeting the metropolitan difficulty is often no longer politically available, even when it would seem theoretically desirable.

Given a metropolitan area with a common social and economic life, what form of government can most effectively replace the existing chaos? This is the question to which the Committee on Metropolitan Government of the National Municipal League turned its attention four years ago. Its findings have now appeared in a book of four hundred pages entitled "The Government of Metropolitan Areas."* The preparation of this voluminous and comprehensive report was made possible by a grant from the Russell Sage Foundation. It is in the first instance the work of Dr. Paul Studenski, who served as Secretary of the Committee. Dean Frank H. Sommer, Dr. Thomas H. Reed and the present writer constituted the subcommittee on editing.

Types of Metropolitan Government

The report is a careful examination of the various types of organization or readjustment of metropolitan government which have been seriously proposed or attempted in the United States. The various plans have been classified as follows: inter-municipal cooperation and exchange of service, consolidation under a unitary form of government, city-county consolidation or separation, expansion of county government to meet metropolitan needs, special metropolitan commissions for specific purposes, the New York borough plan, and the federated region or city.

The report believes that outright consolidation has been

* The Government of Metropolitan Areas. By the Committee on Metropolitan Government of the National Municipal League, 261 Broadway, New York. 1930. 403 pp. $3.50. See Department of Municipal and Civic Publications, this issue.

productive of good in the past. The annexation process had the virture of simplicity, and had it not been employed, more cumbersome devices would have been necessary. Yet there are signs that this simple expedient will no longer serve the complex needs of expansive metropolitan areas. Today the home rule sentiment of the suburbs is respected by politicians. The report assumes, therefore, that a new form of metropolitan government will be developed, even if only as an intermediate step towards consolidation. Probably outright annexation will be used less in the future, because many believe that it does not reconcile metropolitan needs with legitimate local interests.

Handicaps to City-County Consolidation

County government existing alongside local urban governments also raises problems of duplication of work and conflict of authority. Some metropolitan areas have sought to remove this duplication by city-county consolidation. This formula has been applied in at least seven regions with varying degrees of success. But it raises legal and practical difficulties which in a measure offset the economies and reduced overhead which it brings.

Likewise the suggestion that the scope and functions of existing county governments be expanded until the county becomes a truly metropolitan authority has serious limitations. In few cases do existing county boundaries conform to the limits of the metropolitan area; when they do not, they cannot be readily adjusted to coincide. Moreover, experience has shown how powerfully and successfully our present county governments resist change and improvement. Until thoroughly reorganized, the county has small legitimate claim to recognition as to the exclusive agency of metropolitan government.

Special Authorities

Special metropolitan authorities have been frequently availed of when some new metropolitan need demanded immediate attention. Three chapters of the book are devoted to the work of such authorities, which for the most part have had to do with sewage and water-supply development. While recognizing that special authorities have served useful purposes in particular cases, the Committee believes that as a form of organization they have distinct limitations. Although meeting a particular need, they are seen to be essentially a makeshift when the metropolitan area is viewed as a whole.

The Borough Plan

A special chapter is devoted to the borough plan of New York. The rapid physical development which took place in New York following the adoption of this plan is related. It is pointed out, however, that the tendency in charter changes since 1898, when the consolidated charter was adopted, has been in the direction of further concentration. The borough plan, the Committee believes, has worked well within New York City, a fairly compact and homogeneous region. But it has not proved capable of easy expansion to new outlying sectors more loosely attached to the central area. The New York metropolitan region today has outgrown the boundaries of Greater New York, but the borough plan has not been extended and would appear inapplicable to the present situation. Where the sense of metropolitan unity is diluted by considerable local feeling, borough status would fail to satisfy.

Trends Towards the Federal Form

A variety of reasons, some of them practical and some of theme sentimental, suggest that the next experiments in metropolitan government will be in the direction of the federal form. As yet in the United States, federated metropolitan government is only in the discussion stage, but several practical proposals have been presented. The report describes the Boston project of 1894-6, the Alameda project of 1922, the Pittsburgh proposal* defeated by the voters in 1929, and the constitutional amendment for St. Louis voted down last November. The report points out that these four proposals show important variations. Inasmuch as recent experience has demonstrated that annexation or complete consolidation of metropolitan unit is not practicable, federation appears on the horizon as an attractive alternative. Indeed, in some regions federation represents probably the only program possessing a practical chance of adoption in the near future.

Differentials in Taxation

A valuable chapter of the report discusses differentials in taxation in annexation or consolidation schemes. Heretofore too little has been known as to how tax differentials have worked out. The conclusion of the report is that they are undesirable. Offered in the first instance as a bribe to induce outlying territories to accept partnership with the central city, investigation discloses that they soon become inequitable and remain to plague future taxpayers long after the occasion for their establishment has passed away.

The Broad View

In conclusion, the report calls for a broader view and higher statesmanship than has been displayed in the past. The problem will never be solved so long as public leaders confine themselves to individual improvement projects, forgetful of the need for comprehensive programs. Politicians and civic leaders must abandon exaggerated views of home rule and listen to the claims of the larger political community. Local subdivisions have no right to do as they please to the detriment of metropolitan development on a large scale.

The Committee has put forth its views with great diffidence, realizing that the last word still remains to be said. It believes, however, that the factual data with which the report is replete will be of value. The Committee has no panacea or formula to be applied indiscriminately to all regions. Further experimentation and wider research are necessary before dogmatic opinions can properly be asserted.

A Challenge to Ingenuity

The present government of our metropolitan areas satisfies no one who has given it a moment's thought. Fortunately, popular interest in reform is being aroused and we can expect more intensive research in the future. At this moment Europe appears to have attacked the problem with more boldness and success than have we in the United States. A knowledge of European methods and a willingness to adapt Europe's successes to American soil will help; but in the last analysis the proper government of metropolitan areas constitutes a sturdy challenge to American political ingenuity.

* See THE AMERICAN CITY for June, 1929, pages 120-121.

The Municipal Regulation of Gasoline and Oil Storage*—I

By ROBERT S. MOULTON

Technical Secretary,
National Fire Protection Association

THE public in general is apprehensive of the fire hazards of gasoline and other flammable oils, but unfortunately has not grasped the actual facts of the situation, and in considering the subject from the viewpoint of public safety the emphasis is often misdirected. A quart of gasoline brought into the kitchen for cleaning a pair of gloves may be more hazardous than an 80,000-barrel gasoline tank properly constructed and located. The large tank is in general under supervision of men familiar with the properties of gasoline who have found by experience that it is good business to take proper fire prevention precautions. The woman using gasoline in the kitchen is ignorant of the properties of the liquid; she does not realize the explosive character of a mixture of gasoline vapor and air, nor does she know how easily it may be ignited.

AN OIL REFINERY FIRE

The oil refinery presents a fire hazard much greater than that of ordinary oil storage properties. Oil refineries should be located outside of cities or in districts especially zoned for hazardous occupancies

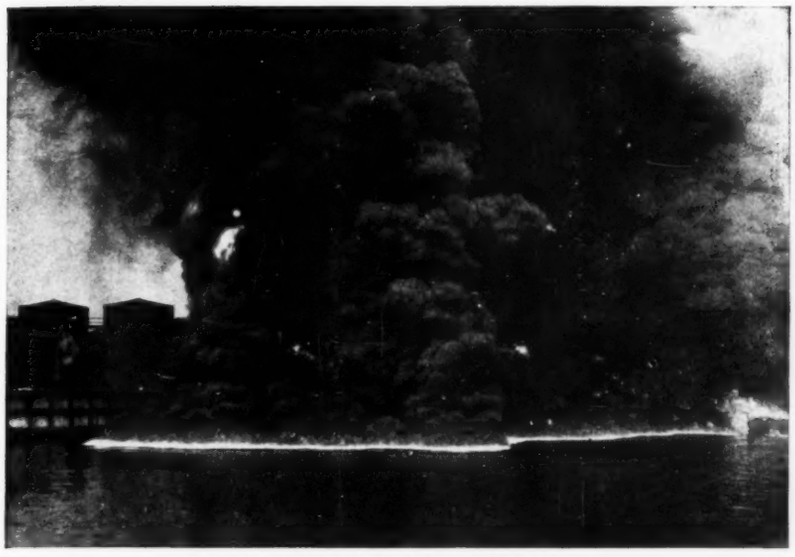
Gasoline and other flammable oils are always potentially dangerous, but, like other fire hazards, their use may be safeguarded. After many years' experience, methods of storage and handling these flammable liquids have been developed which tend to minimize the potential hazard, and through the application of recognized measures of fire prevention and protection the public safety from gasoline and oil fires may be reasonably safeguarded. It is the purpose of this article to urge an intelligent public viewpoint of this entire problem and to direct attention not merely to the properties where there is visual evidence of the presence of large quantities of gasoline and oil, but at other situations where the fire hazard may be actually far more acute.

Various other liquids such as ether and alcohol have hazards similar to gasoline and other petroleum products, and are properly subject to the same type of municipal regulation as applies to gasoline, kerosene and similar liquids. The principles discussed in this article are all applicable to flammable liquids in general, irrespective of whether they are derived from petroleum or other sources, but as gasoline is the flammable liquid encountered in the largest quantity, it has been convenient in this article largely to discuss gasoline, with the understanding that the same comments are in general equally applicable to other flammable liquids.

Oil Supply a Public Necessity

It might be desirable from the viewpoint of fire hazard to eliminate gasoline and oil altogether from our cities. We cannot do this. The use of gasoline and other flammable liquids is now almost universal, and

* EDITORIAL NOTE.—Through the courtesy of the National Fire Protection Association, THE AMERICAN CITY has the privilege of publishing in two instalments, of which this is the first, the accompanying article, which is to appear in the forthcoming issue of the Association's *Quarterly*. Mr. Moulton's discussion of this important subject of the municipal regulation of gasoline and oil storage is believed to be the most comprehensive and practical which has yet appeared.



A TANK FARM CONFLAGRATION

Wood is not a suitable material for the construction of any part of an oil tank. Wooden-roofed tanks have been responsible for most of the major oil conflagrations in the past. Modern practice is to use all-steel construction

any measures instituted to promote the public safety in the use of these liquids must always consider the fact that a convenient supply of gasoline and oil is a public necessity. Public safety measures should be adequate for public safety, but should avoid unnecessarily burdensome requirements, for such will merely impose an additional cost upon the general public as the users of gasoline and oils. We should fully recognize the fire hazard of large-scale storage and handling of flammable liquids, but should remember that in the public mind this is often exaggerated and that as a practical matter there is sometimes a greater hazard in the relatively small-scale handling of gasoline and oils in the home and in the hands of the small operator who has not the background of skill and experience possessed by the large oil companies.

Oil Tanks as Neighbors

An oil tank is not ordinarily considered a desirable neighbor. It is an unsightly addition to a residence district, and it is not surprising that a storm of protest arises from the residents of any district where a large-scale oil storage property is proposed. It is not the purpose of this article to defend oil tanks from an esthetic viewpoint, but to urge that where the objection to an oil storage property is based on the appearance of the tanks, the objection should be voiced on this ground. As a practical matter, the esthetic objections to an oil tank location are rather intangible and difficult to support in court. Fire hazard is a much more tangible and definite thing. We find in public hearings on petitions for the construction of oil tanks in or adjoining residential districts that the fire hazard is the point largely emphasized, although if we may judge from conditions in their own homes and business properties, many of the objectors really know or care very little about the fire hazard. They merely seize upon it as a method of attack upon the proposed oil tanks which, for altogether different reasons, they do not care to have in their district. This is an unfortunate situation and tends frequently to confuse the issue.

Public opposition to an oil tank location on the grounds of fire hazard is frequently illogical. The writer was recently asked by a chamber of commerce to inspect the site of a proposed gasoline tank the erection of which had been opposed in a petition signed by several hundred residents of that district of the city. It was an old oil storage property dating back many years, with a number of 10,000-gallon gasoline tanks housed inside wood frame structures, with the gasoline handled by air pressure instead of pumping. This arrangement represented a severe fire hazard—one which would not be found in a more modern installation. These tanks had been in the same location for twenty years. During this time no objection had been raised to their presence by residents of the vicinity, presumably because the tanks were inside buildings and could not be seen, although it must have been known through the district that gasoline was handled there. The proposed tank was to be a modern all-steel structure, and its erection was to be the first step in a program of modernization of the plant which would have tended greatly to reduce the fire hazard.

Considering the matter solely from the viewpoint of fire hazard and giving no thought to unsightliness or possible unpleasant odor, there is of course a definite fire hazard in having an oil tank as a neighbor. Modern oil properties, however, have a good fire record, and the serious fire is of infrequent occurrence. As far as the "exposure" to adjoining property is concerned, the fire hazard of a hay barn is probably greater than that of a modern gasoline tank under competent management.

The Classification of Flammable Liquids

The flash point of a flammable liquid is the lowest temperature at which it can give off combustible vapors in dangerous quantity, as measured with a standard testing apparatus. The flash point of gasoline is zero Fahrenheit, or lower, that of kerosene above 100° F., and that of lubricating oils in general ranging above 300° F. Flash point is only one of several characteristics determining the relative hazard of flammable liquids, such as volatility, explosive range, and vapor ignition temperature, but it is a convenient measure of hazard and is generally used in differentiating between the hazards of various classes of liquids.

The lower the flash point. the greater is the hazard, but in handling flammable liquids it is unwise to rely on fine distinctions of flash point, and any liquid which has a flash point below ordinary atmospheric temperature should be treated with due respect. For purposes of municipal regulation of flammable liquids it is necessary to set some definite upper limit of flash point, with liquids having higher flash points not classed as flammable. The National Fire Protection Association has set this figure at 187° F., and the provisions of its suggested ordinance are designed only to apply to liquids having a flash point below this figure.

Analyzing the Hazard as to Quantity and Quality

The seriousness of any individual fire hazard depends in general upon two factors, one the probability of the start of fire, and the other the potential extent of fire once

started. With flammable liquids, the probability of the start of fire depends upon the character of the liquid and the method of handling, the presence or absence of potential sources of ignition, and the personal element. The total quantity stored has relatively little influence upon the probability of the occurrence of fire; an open flame will ignite a hundred gallons or a thousand gallons of gasoline with equal facility.

Once a fire is started, the extent of course depends upon the quantity of liquid, and where tanks collapse and gasoline flows freely over the ground, there is a great difference between a 500-gallon and a 50,000-gallon fire. Where burning takes place in an enclosure, the rate of burning depends largely upon the rate of air supply to the burning surface, and as a practical matter a larger quantity of liquid is likely to mean a fire of longer duration rather than a more severe fire at any one time. Large oil fires sometimes burn for days before the oil is consumed.

The community fire hazard of an oil property is greater when the quantity of oil stored is increased, but the increase in hazard is not in proportion to the amount of increase in quantity of oil stored. If it were possible to measure in exact figures the community fire hazard of an oil storage property, it might be found that a 100 per cent increase in quantity of oil would mean only a 10 per cent increase in hazard. When considering applications for the installation of oil storage tanks, the municipal authorities should be much more concerned with the general character and method of operation of the property than with the mere size of the storage in gallons.

Indoor vs. Outdoor Storage

The fire hazard of storage of flammable liquids inside buildings is much greater than that of similar storage outdoors. In buildings, there is not only the additional property value exposed to fire damage, but also an increased hazard owing to the danger of accumulation of flammable vapors. Outdoors, breezes and natural drafts tend to dissipate vapors as they are formed, but in buildings, unless special attention is given to the method of handling flammable liquids and to ventilation, there is always danger of accumulation of flammable or explosive vapors. For this reason the storage and use of flammable liquids indoors is properly subject to more stringent requirements than would apply for outdoor storage.

In the case of paints, varnishes, etc., some of which contain solvents giving the product the characteristics of a flammable liquid, the vapor hazard does not appear as long as the liquids are handled only in the original sealed containers, and for this reason it is usually considered unnecessary to apply any special regulations to the hardware store, for example, which sells paints and varnishes in original sealed cans. Where mixing is done, and the liquid paints or thinners exposed to air, there is a definitely increased fire hazard.

The Proper Location of Oil Storage Properties

Oil storage properties should be located away from residence districts where they are not wanted. This is primarily a matter of zoning requirements. From the viewpoint of fire hazard as well as the desirability of the oil tank as a neighbor, it might be well if all oil storage properties could be located in the open country well away from cities and remote from waterways, roads and railroads. As a matter of fact, the same argument might be applied to a number of other types of hazardous business which are commonly found within the limits of our cities. It is obvious that such remote location is impracticable. Oil tanks should of course be kept outside of the congested and high-value mercantile districts. They should be in outlying industrial districts where their operation is economic and where their presence is consistent with the type of other occupancy of the district. It is a common requirement of cities to prohibit the location of oil storage properties in the business center, or rather to require all such oil storage in the business center to be underground, which has the same result as far as public safety is concerned.

Distance to Adjoining Property

A question frequently raised in connection with the location of large oil storage properties is the distance which should be maintained between oil tanks and other property in order to avoid undue hazard to the buildings adjoining the oil tank. It is not possible to answer this question definitely except on the basis of the local conditions. The size and character of the oil tank, the dikes or fire-walls provided to stop the flow of oil in case of escape of oil from the tank during a fire, the topography of the ground, and other features, all have a bearing. In the Flammable Liquids Ordinance of the National Fire Protection Association this matter is left to the judgment of the fire chief or other municipal authority as follows:

CAPACITY AND LOCATION OF ABOVE-GROUND TANKS

SECTION 47. In case of tanks for the storage of Class I, II and III

A TANK INTACT AFTER A FIRE

The modern all-steel gas-tight tank, with proper vents, usually comes through a fire undamaged. This picture shows gasoline vapor burning above the tank, which retained its contents until consumed and was still standing after the fire. The general fire around the tank seen in the picture was chargeable to various sub-standard features in other portions of this oil storage property

liquids at marketing stations, wholesale storages, port terminals and other properties where flammable liquids are stored in quantities, the distance from the line of adjoining property which may be built upon shall in no case be less than set forth in Table 1 nor less than double these distances in the case of tanks for the storage of crude petroleum. In particular installations these distances may be increased at the discretion of the authority having jurisdiction after consideration of the special features such as topographical conditions; nature of occupancy and proximity to buildings on adjoining property and height and character of construction of such buildings; capacity and construction of proposed tanks and character of liquids to be stored; degree of private fire protection to be provided, and facilities of the fire department to cope with oil fires. Consideration of these features shall also determine the distances for tanks of capacities of over 50,000 gallons.

TABLE 1—MIMINUM DISTANCE OF OUTSIDE ABOVE-GROUND TANKS FOR CLASS I, II AND III LIQUIDS OTHER THAN CRUDE PETROLEUM TO LINE OF ADJOINING PROPERTY WHICH MAY BE BUILT UPON

Capacity of Tank, Gallons	Minimum Distance to Line of Adjoining Property Which May Be Built Upon
0 to 12,000	10 feet
12,001 to 24,000	15 feet
24,001 to 30,000	20 feet
30,001 to 50,000	25 feet

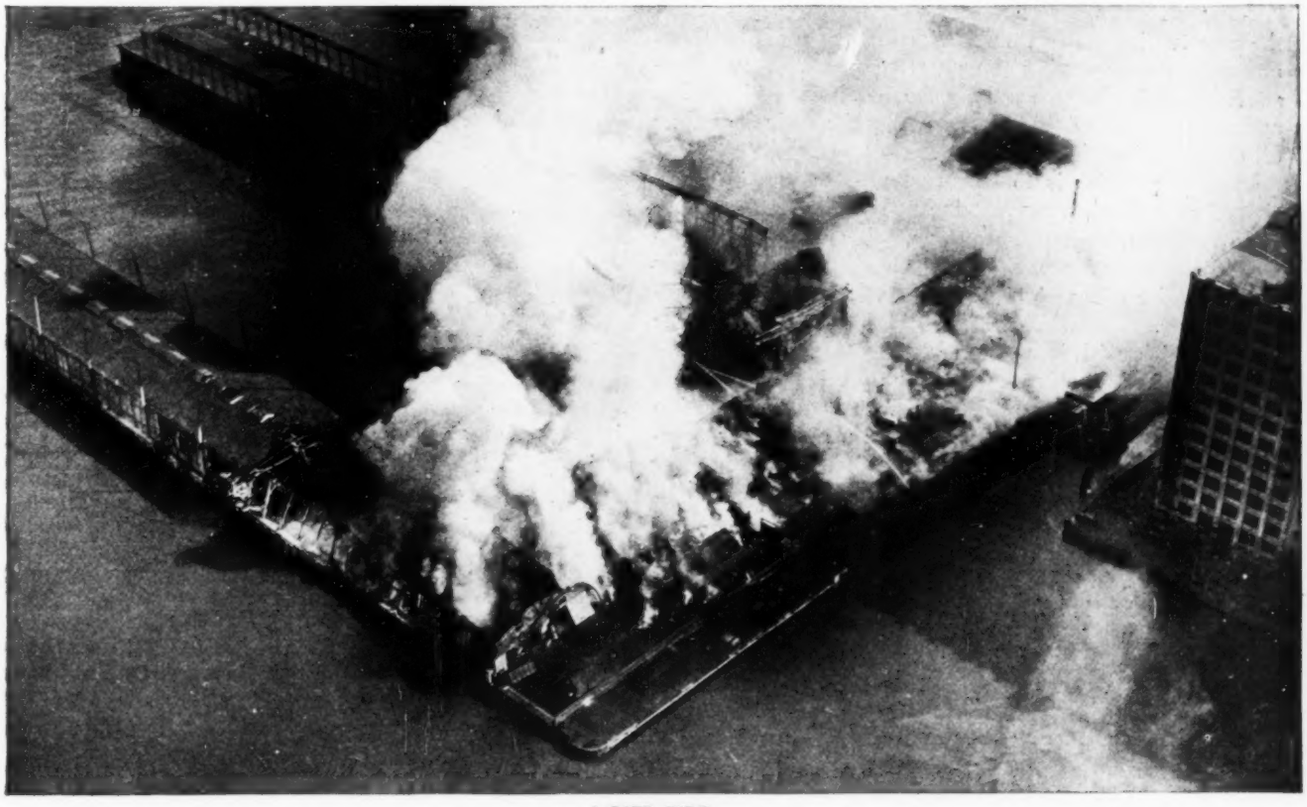
Crude oil usually contains a certain percentage of water, which may suddenly boil over when the oil is heated in burning, greatly increasing the hazard of fire in a crude-oil tank as compared with the hazard of a fire in a tank of gasoline or other refined petroleum product. For this reason crude-oil tanks should be located farther away from adjoining property than is required with other tanks, and various other special precautions should be taken. Crude-oil storage will ordinarily be found only near oil wells and at refineries.

Underground vs. Above-Ground Storage

Gasoline and oils in underground tanks present practically no fire hazard so far as the storage itself is concerned. A tank buried under two or three feet of earth and protected from mechanical injury by a concrete slab which will take the load of a truck or any heavy weight which may be placed above the tank, is practically immune to fire danger. (A few recorded fires or explosions in underground tanks are in the nature of freak cases which are very much the exception.) Underground storage is much the best from the fire hazard viewpoint and is commonly required wherever the storage must be located in the congested high-value districts of cities. Domestic oil-burning installations likewise largely use buried tanks where the quantity of storage is greater than can be safely located in the basement.

With the gasoline underground, the hazard of the storage itself is eliminated, but there remains of course the hazard of handling the gasoline to and from the tanks. The tanks must be filled by deliveries from the tank truck or in some other way, and the gasoline likewise must be withdrawn from the tank for use. Carelessness in either filling the tanks or withdrawing, permitting leakage or the escape of gasoline vapors, is obviously a potential hazard. It should be noted that this hazard is one which depends upon the operating personnel and the character of the supervision given the property rather than upon the capacity of the underground storage in gallons.

Underground storage tanks, in order to be safe, must be located at a safe distance from basements or any pits into which gasoline might flow in case of any leakage of the tank. As long as the tank is below any surrounding basements or pits, there is no restriction as to the size. Where the top of the tank is above the level of nearby basements or pits, the safety requirements call for limitation of the size of the tank in proportion to the distance from the building. There is no danger in locating a tank under the basement floor, provided there are no lower basement levels nearby and provided that the filling and vent con-



A PIER FIRE

Oil discharged on river or harbor waters forms an oily coating over wooden piling and pier substructures, increasing the fire hazard. Laws and ordinances prohibiting the discharge of oil on river and harbor waters should be strictly enforced

nections are outside the building rather than in the basement.

While underground storage is unquestionably the safest method, it is practicable only for moderate quantity storage. Where large-quantity storage is involved, the expense and mechanical difficulties of underground storage are such as to make this impracticable, and above-ground tanks are used. Above-ground tanks of proper design and construction, correctly located, and provided with dikes or fire-walls to prevent the flow of oil towards adjoining property in case of leakage of the tank, have, as previously indicated, a relatively good fire record.

GASOLINE BURNING ON SURFACE OF WATER

Burning gasoline floating on the surface of the water serves to spread fire to shipping and waterfront property. Proper dikes around tanks near rivers and harbors retain the liquid in case of leakage or failure of tanks and greatly reduce the danger of fires like that shown above

All-Steel Gas-tight Tanks

Wood is a valuable construction material, but it is not suitable for the construction of any part of an oil tank. The former use of wood in oil tank construction has a good deal to do with the popular distrust of oil-tanks in general. All-wooden tanks have not been used for many years, but the construction of steel tanks with wooden roofs has been abandoned only during the past ten years. A wooden-roofed tank is dangerous from the fire hazard viewpoint, and it is in tanks of this character that the majority of the oil conflagrations have occurred.

Modern practice is to construct all-steel tanks tightly riveted or welded to prevent leakage or the escape of vapors, and provided with proper venting arrangements to relieve any excessive pressure. Such a tank usually comes through a fire with very little damage. Fire occurring outside such a tank will heat the liquid and boil off the vapor, which will issue from the vents and burn there harmlessly as a jet of gas. After the fire is over, the tank may be still half or two-thirds full. Of course, with improperly designed or constructed tanks, and under occasional exceptional combinations of circumstances, there may be serious trouble even with an all-steel, gas-tight tank, but this is unusual.

Features of particular importance in above-ground storage properties, in addition to all-steel, gas-tight tank construction, separation from adjoining property and dikes, are adequate venting facilities, and proper separation between tanks, warehouse buildings, and "loading racks" where tank trucks are filled.

Storage Near Rivers and Harbors

Gasoline or oil tanks adjacent to rivers and harbors present a special problem in that in the event of failure of tanks and escape of oil, it may float on the surface of the water and spread fire with great rapidity to shipping and waterfront property. Where feasible to do so, it is advisable to locate tanks downstream, or so that the prevailing winds may carry burning gasoline on the water away from waterfront property. Obviously, tanks should not be located on piers or wharves of combustible construction.

The hazard of floating gasoline can be guarded against by surrounding waterfront tanks with dikes to contain the liquid in case of any leakage from the tank. Where oil pipes extend to piers to connect with ships transporting oil or fueling purposes, care in operation and proper valves to minimize the quantity of oil released in case of leakage of the hose connecting with the ship, serve to reduce the hazard to a reasonable minimum.

The presence of any oil on the water, even heavy oil that is not readily flammable, is undesirable from the fire hazard viewpoint, because wooden piling and pier substructures are much more susceptible to fire when oil coated. The discharge of oil on navigable water is prohibited by state and Federal legislation.

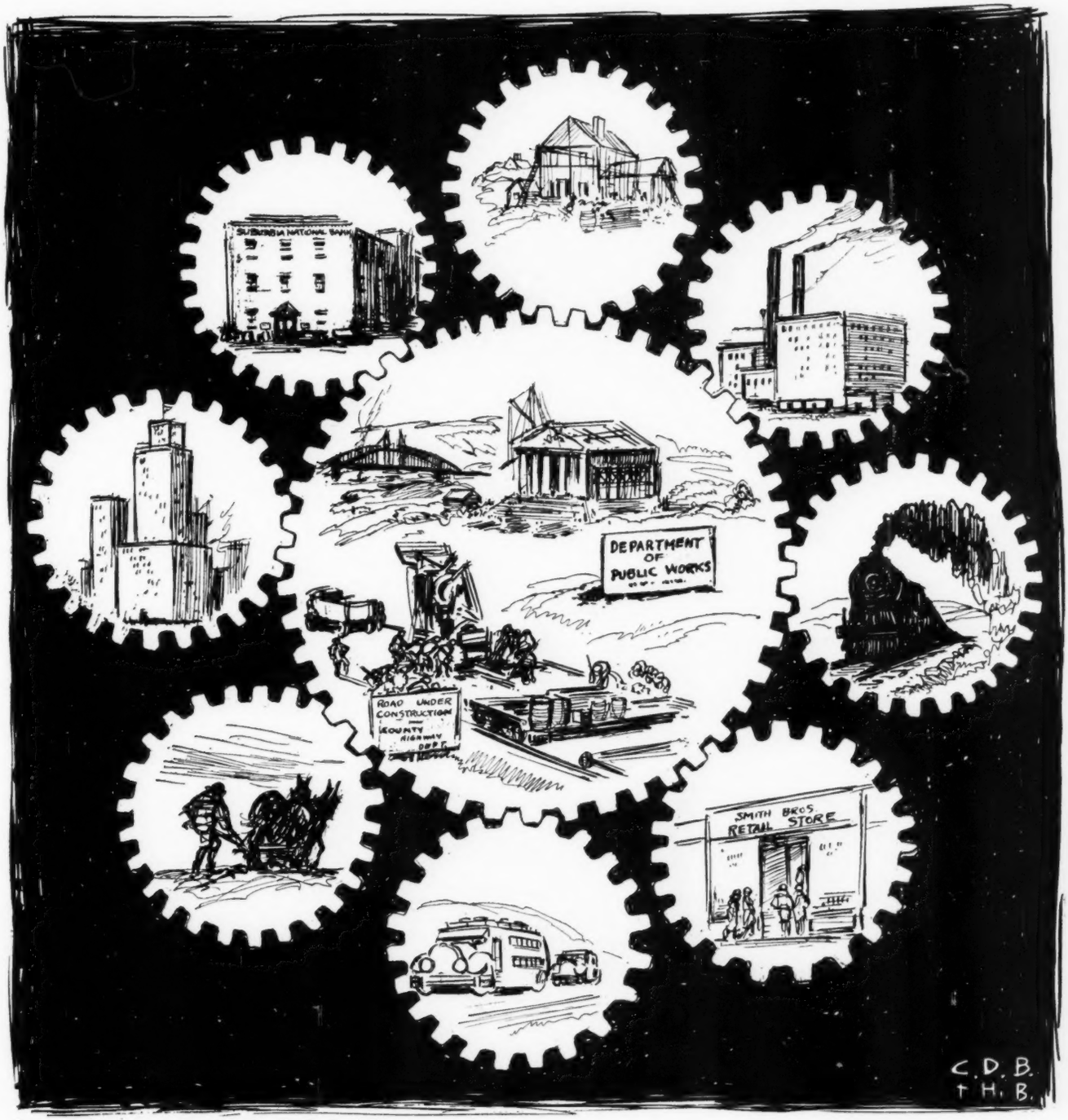
Municipal Reference Library's Expanding Service

NOW located in new quarters on the 22d floor of the Municipal Building, the Municipal Reference Library of New York is to be congratulated not only on its more convenient and commodious facilities, but on its increasingly valuable service to the city. The expansion of the Library from 500 volumes in 1913 to its present collection of over 50,000 books and pamphlets on the administrative and technical problems of city government indicates how it has increased in importance since its inception.

Seventeen years ago the then Comptroller of the city of New York proposed to the Mayor and the other members of the Board of Estimate that a library should be created in which all the published records of the city could be assembled in one place for the use of city officials and those interested in the municipal government. Similar records of other important American and foreign cities were to be included, as well as significant books. The plan being approved, the New York Public Library and the Bureau of Municipal Research were asked to assist in forming the new library, which shortly became a branch of the New York Public Library, though operated primarily for city officials and employees.

Extensive collections have been made of material on subjects as varied as aviation, subway financing and construction, city planning, traffic relief, sanitation and street cleaning. These are made use of by alert public officials who seek to know what progress has been made by others who face the same problems, and, more often than its citizens know, thousands of dollars have been saved to the city by avoiding the mistakes made by other cities.

In order to facilitate the use of its reference resources, the Library published a weekly bulletin called the *Municipal Reference Library Notes.*



Drawn for THE AMERICAN CITY *by C. D. Batchelor*

Public Improvements, the Master Wheel

Give it greater power and speed, and all the other wheels will spin more rapidly

A belief that there exists throughout the United States a great mass of potential public construction which could be started or speeded up as a means of relieving the unemployment situation and helping business generally, has resulted in a report just completed by S. W. Straus & Company, in cooperation with 256 chambers of commerce in the leading cities of the country.

More than $4,500,000,000 worth of public improvements are needed in the United States at the present time, according to this report. The term "public improvements," as used in the survey, includes highways, parks, civic and educational buildings, subways, railway terminals and grade crossings, hospitals, airports, water supply and drainage projects, prisons, armories, bridges, etc. Such private ventures as residential or office buildings, apartments, factories, and the like, are not included.

According to the report, about $1,200,000,000 of this public construction work is now going forward, while approximately $3,300,000,000 is being held up, delayed or postponed for various reasons. "It is encouraging to note," the survey concludes, "that throughout the country concentrated efforts are being made to eliminate red tape, overcome obstacles, and speed up construction projects of every nature. If these efforts are continued and intensified, conditions throughout the building trade and allied lines, and subsequently throughout business generally, will be manifestly improved."

Express Highways Combined with the "Steadyflow" System

By FRITZ MALCHER

WE should call only such streets "express highways" as will allow maximum speeds for automobile traffic absolutely uninterrupted by cross traffic, either vehicular or pedestrian. Only one lane in each direction should be used for traffic entering the highway. All other lanes can then be used to their highest effectiveness of speed and capacity—1,800 cars per lane at 20 miles an hour, or 1,400 cars at 40 miles an hour, for example.

The "steadyflow" system, as illustrated and described in THE AMERICAN CITY for August, 1930 (page 107), allows a traffic effectiveness of about twice that of the synchronous "stop-and-go" system, but we need roads where this figure is again doubled. Highways which make such traffic effectiveness possible may properly be called "express highways."

Illustration 1 explains the different speeds on the various lanes of highways with unseparated and separated roadways. On the usual highway, with roadways in two directions, it is not possible on the inside lanes for cars driving at night, using full headlights, to attain a safe speed higher than about 30 miles per hour. Therefore, on a highway with four unseparated lanes in each direction, the average speed of moving cars would be, counting from the outside to the inside lanes, 30, 40, 50 and 30 miles per hour.

To get higher speeds on this kind of highway, it would be necessary to permit the cars with the highest speed to travel on the outside lane. The result would be, if this lane were nowhere interrupted by vehicular or pedestrian traffic, a possible average speed as high as 60 miles per hour. Ramps or other access lanes would have to be placed, of course, in the middle of the highway, and, therefore, the lower speed would be on the inside lane.

If roadways are separated with middle strips 40 feet wide or more, it becomes possible to use the lanes in the usual way—lower speeds on the outside and higher speeds on the inside lanes—for example, 30, 40, 50, and 60 miles per hour, respectively, on a four-lane roadway.

To get this kind of increasing speed on lanes of ordinary unseparated highways, it would be necessary to separate the two roadways with a kind of wall, high enough to make it impossible for drivers in opposite directions to be observed one by the other. But such driving near a wall would hardly allow a higher speed than 40 miles per hour.

Illustrations 2 and 3 show an ideal highway, separated with a wide middle strip, north of Philadelphia.* Illustration 4 gives a correct layout of a "clover-leaf" grade separation of two express highways where only the outside lane is used for entering traffic, and the three inside lanes have absolutely uninterrupted through-traffic.

If all four lanes of an express highway are to be used for uninterrupted traffic, the exact layout for a grade separation is shown in Illustration 5. In such a separation the two roadways can be placed far enough apart for a middle strip to be developed without changing other details. If a grade separation between an express highway and an arterial highway is to be planned, the "steadyflow" system can be used for the arterial highway, as shown by Illustration 6. This means that by the use of oblique crossing areas on the arterial highway only four ramps approaching the express highway are necessary. But it is also possible to place two ramps for both directions on one side of the arterial highway, as demonstrated by Illustration 7. Where only inside ramps can be provided, Illustration 8 gives a satisfactory layout of an intersection between an express highway and an ordinary highway, and Illustration 9, between an express highway and an island intersection of two ordinary highways.

The use of inside ramps is almost always necessary for elevated express highways over existing streets bordered by high buildings. Examples are the new elevated express highway on the west side of Manhattan Island, and the one for the center of Boston proposed by Robert Whitten.

An intersection between an express highway and two arterial highways is shown in Illustration 11. Each of the arterial highways has one roadway with grade separation, which makes it possible to use the diagonal connection for uninterrupted traffic.

The same kind of intersection, but without oblique crossing areas on the arterial highways, is found in Illustration 10. In this case, of course, four approaching ramps for both directions are necessary between the express highway and the two arterial highways, and the diagonal connections can be used also for express traffic.

Where Should Express Highways Be Built?

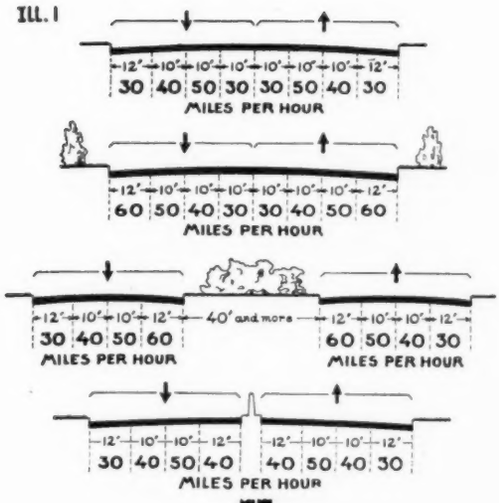
Besides this study of proper layouts of express highways and their intersections, it seems necessary also to consider where such highways should be built. The diagrams in Illustration 12 take as a basis areas with average populations. Numbers I and II assume a global or total community traffic of 9,600 cars. In No. I each of the 25 squares distributes 384 vehicles to the other squares (residential areas). In No. II each of the 25 squares distributes 384 vehicles to the center square (business center). Numbers III and IV take as a basis of global traffic of 3,456 cars. In No. III each of the 9 squares distributes 384 vehicles to the other squares (residential areas); and in No. IV each of the 9 squares distributes 384 vehicles to the center square (business center).

The result is that in No. I the volume of traffic in the center is 2.9 times more than that in the outside corners; in No. II, 25 times more; in No. III, 1.7; and in No. IV, 9 times more in the center than in the outside squares. This requires a decentralized layout of buildings in the city, and, therefore, decentralization of the city traffic; and on the other side, keeps through traffic out of the city.

The left part of Illustration 13 shows in diagrammatic

* EDITORIAL NOTE.—A "clover leaf" type of grade separation, with middle strips, is illustrated on page 86 of this issue.

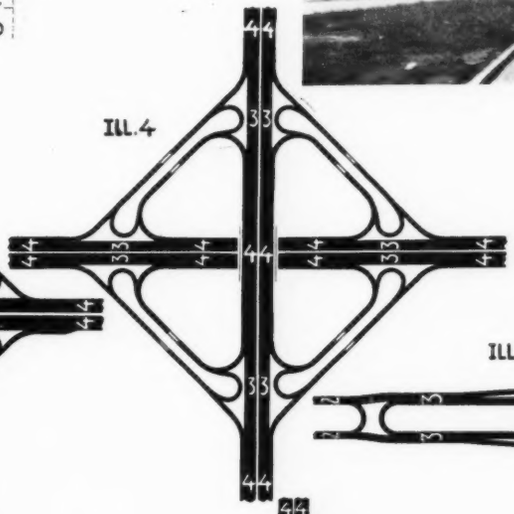
ILL. 1



ILL. 2

ILL. 3

ILL. 4



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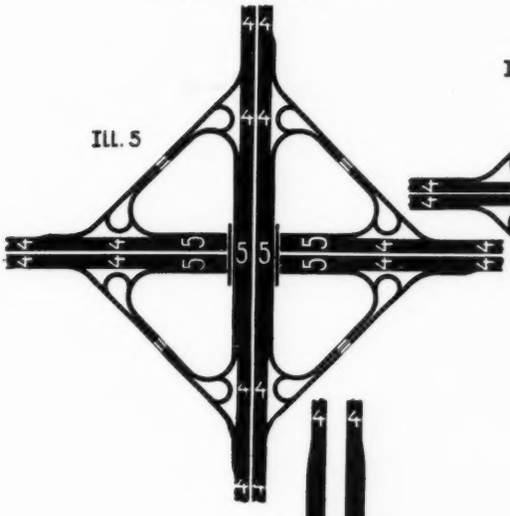

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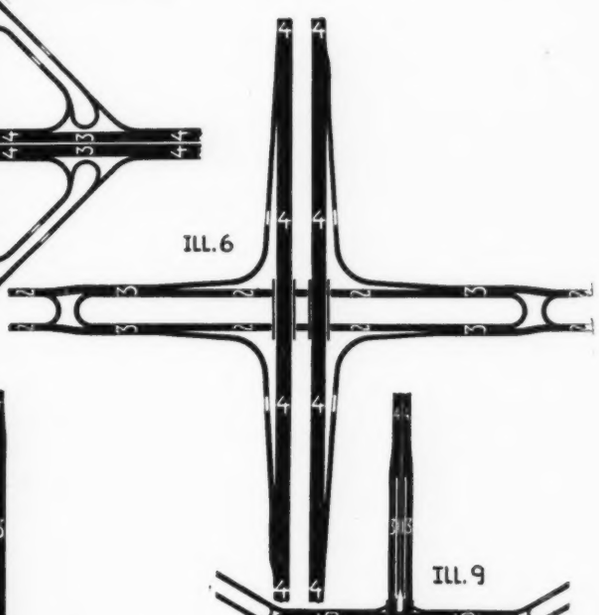
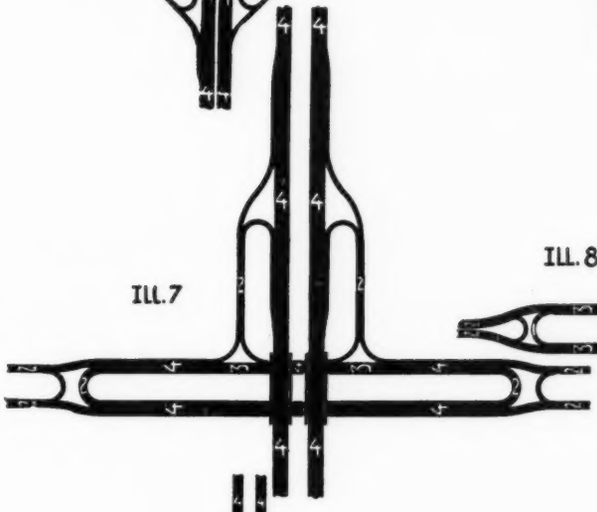


ILL. 7



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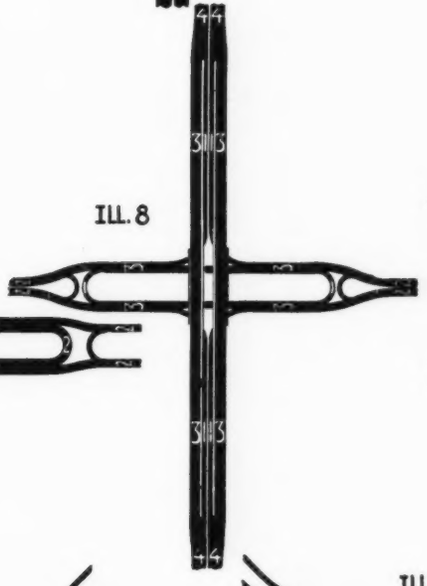

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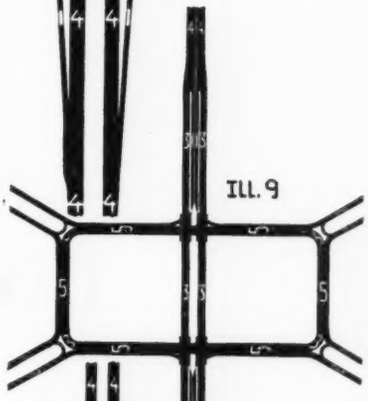
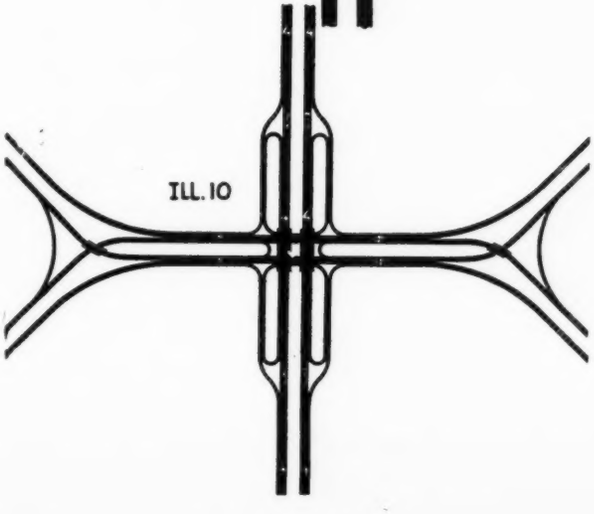
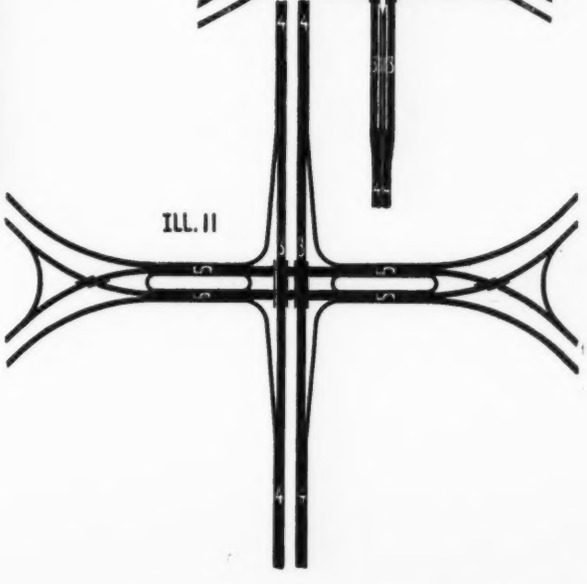
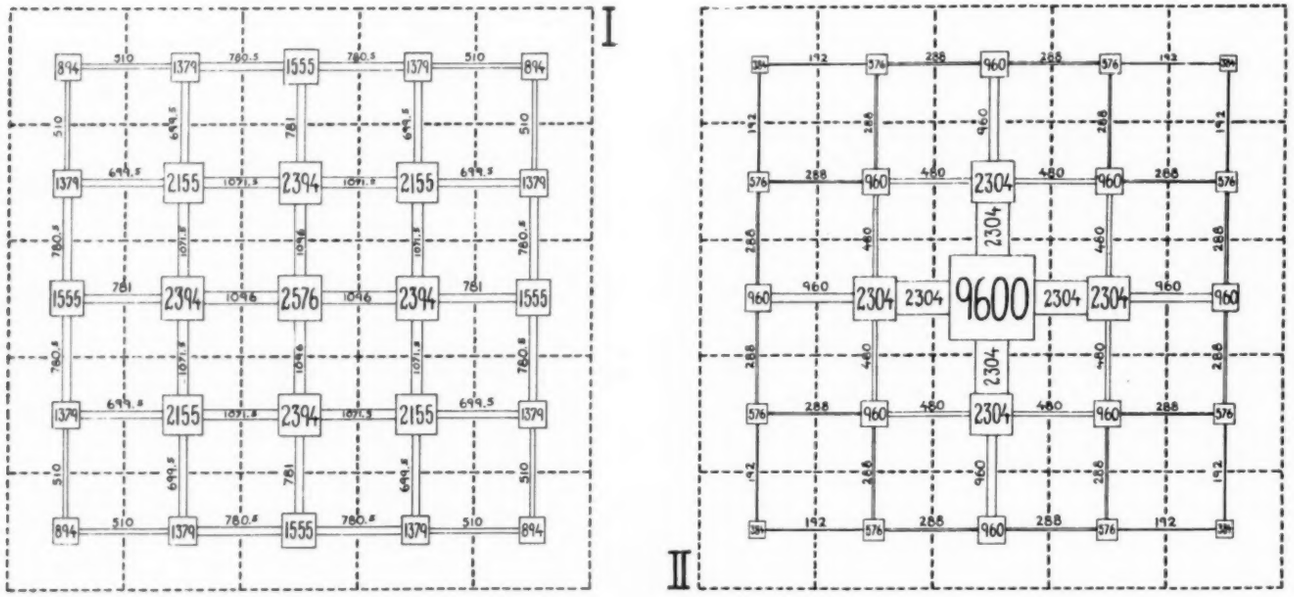


ILL. 10

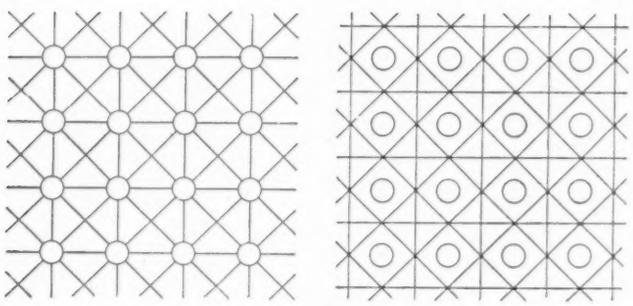


ILL. 11

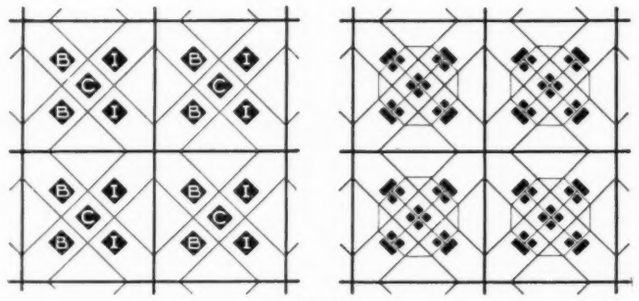



I
II
SCALE:
ON THE BASIS OF A GLOBAL TRAFFIC OF 9600:
I. EACH OF THE 25 SQUARES DISTRIBUTES 384 VEHICLES TO THE OTHER SQUARES
II. EACH OF THE 25 SQUARES DISTRIBUTES 384 VEHICLES TO THE CENTER SQUARE
ON THE BASIS OF A GLOBAL TRAFFIC OF 3456:
III EACH OF THE 9 SQUARES DISTRIBUTES 384 VEHICLES TO THE OTHER SQUARES
IV. EACH OF THE 9 SQUARES DISTRIBUTES 384 VEHICLES TO THE CENTER SQUARE
III
IV

ILL. 12



ILL. 13



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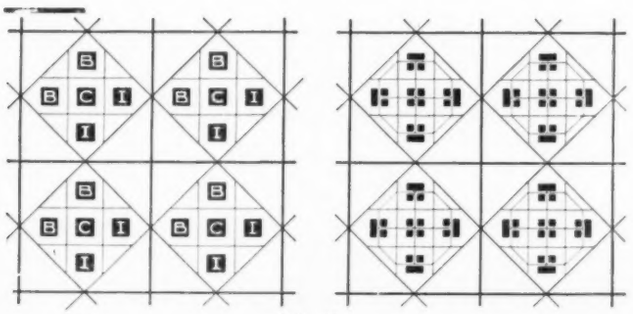
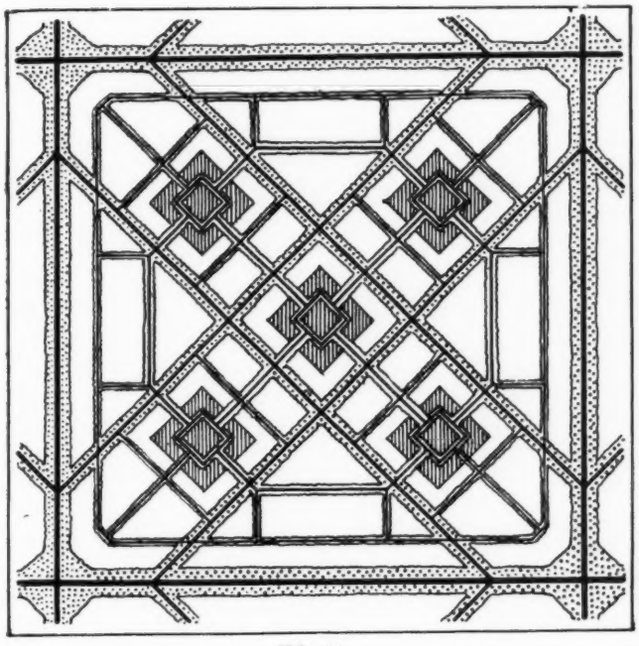


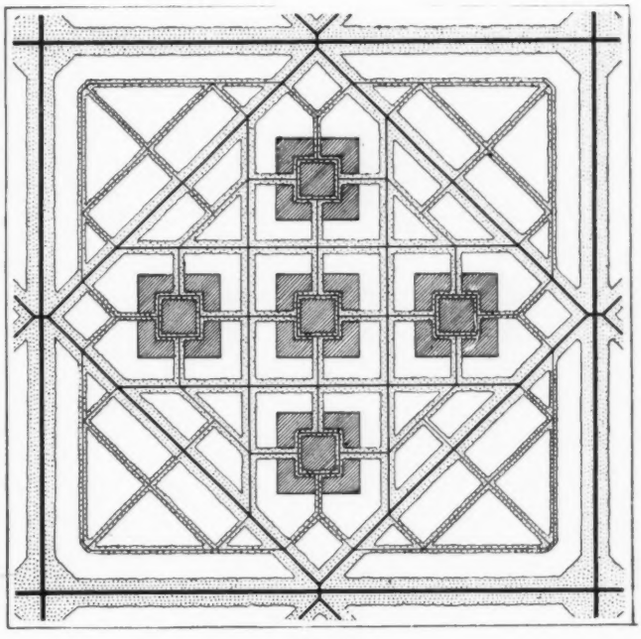
ILL. 15

form the usual direction of traffic from one city to another. On the right is shown the layout of through traffic on express highways in the outskirts of the city; on such highways through traffic not desirous of entering a city will pass between cities instead of through them.

Decentralization of non-residential buildings in a city, to be effective, requires their grouping in various centers—for example, business, civic and industrial. Illustration 14 is a schematic layout for through traffic showing the movement of diagonal express traffic between the different centers of a city. The diagram on the right demonstrates also the approaching or local traffic between such centers.



ILL. 16



ILL. 17

Illustration 15 shows a layout where the diagonal through traffic of express highways moves outside of the different centers. The illustration to the right demonstrates again the necessary approaching local traffic.

Other street plans for necessary local traffic combined with the already demonstrated express highways are shown in Illustrations 16 and 17. Both of these street systems are planned as parkways with approach lanes for the buildings, as illustrated and described in THE AMERICAN CITY for January, 1930 (page 158).

EDITORIAL NOTE.—The foregoing discussion has been abstracted by Mr. Malcher from a paper, with lantern-slide illustrations, which aroused much interest at the December, 1930, meeting of the American City Planning Institute, in the Russell Sage Foundation Building, New York. Reprints of this and other papers describing the "steadyflow" system are available on application to the author, at 56 West 45th Street, New York.

Important International Exhibitions and Congresses Planned

For Berlin, Milan, and London

NOT less than fourteen nations have already reserved space for participation in the International City Planning and Home Building Exposition which will be held June 1-6, 1931, in connection with the German Building Exposition in Berlin. Among the nations to be represented are the United States of America, England, Italy, Austria, India, the Netherlands and New Zealand. Negotiations with a considerable number of others are reported to be almost completed.

The Exposition will be held under the auspices of the Verein Bauausstellung in conjunction with the city of Berlin. The President is Baurat Dr. Riepert, a member of the Federal Economic Council of Germany and of the Board of the Federal Association of the German Industry.

Nearly fifty congresses and meetings of international and national organizations directly or indirectly connected with city and home planning and building will be held during the time of the Building Exposition, among them: International Housing and Town Planning Federation; International Housing Association; International Federation of Building and Public Works; Road Building Congress; German Building Week.

The chairman of the committee preparing the International Exposition is Dr. Schmidt of Essen, and the Business Manager, City Building Councillor Koeppin of Berlin.

For the United States, the assembling of exhibits is in charge of Flavel Shurtleff, of the National Conference of City Planning, and Lawrence Veiller, of the National Housing Association.

Sanitation and Hygiene Congress

Reservations are also already being made for the Second International Congress of Sanitary Engineering and Municipal Hygiene to be held in Milan April 20-26, 1931.

The Congress will be held in six sections: (1) General, Public and Private Hygiene; (2) Sanitary and Municipal Engineering; (3) Sanitary Engineering Relative to Buildings—Dwellings and Public Edifices; (4) Sanitary Engineering, Colonial and Rural; (5) Sanitary Engineering Relative to Works and Workshops; and (6) Urban, Industrial and Rural Sanitary Law—Prevention of Accidents During Work. The Congress is under patronage of the King of Italy, with Mussolini as Honorary President. Applications for information and reservations may be addressed to the Congress, 17, Piazza del Duomo, Milan, Italy.

International Congress of Local Authorities

Although the International Congress of Local Authorities does not convene until May 23, 1932, detailed arrangements are already being made by the English Associations of Local Authorities and the London County Council for two-days meetings to be held in Westminster, and for the remainder of the week to be spent in traveling meetings. Delegates in groups will visit housing schemes, traffic systems, and municipal undertakings of all kinds, and will be tendered municipal and other receptions in London and its vicinity. For the following week, tours have been planned to different parts of England. The Hon. Secretary to the Congress is G. Montagu Harris, O.B.E., Ministry of Health, Whitehall, London.

FORWARD STEPS

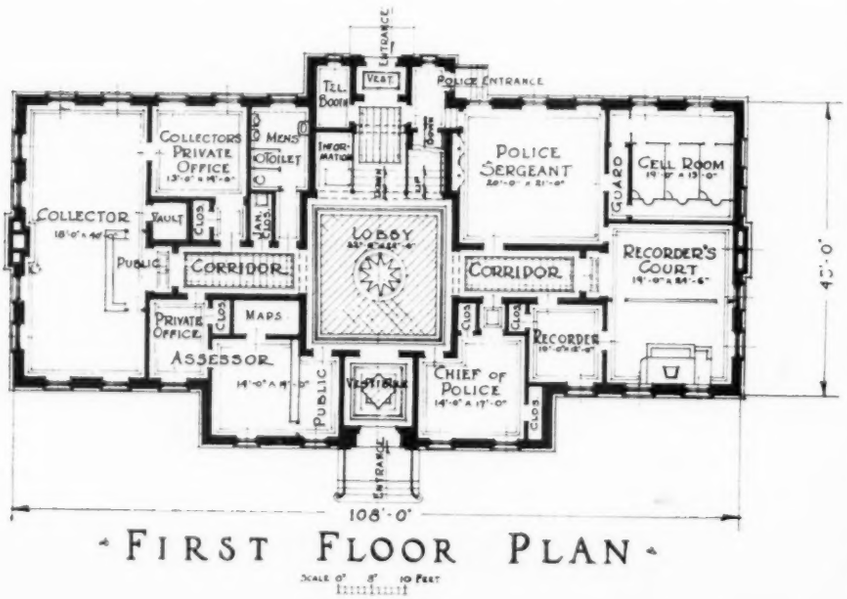
Reported by
Municipal Officials, Chamber of Commerce Executives, and Others

ARCHITECTS' DRAWING, CALDWELL BOROUGH HALL
The plan of the first floor is reproduced below

Proposed Civic Center Will Remedy Midtown Traffic Congestion

CALDWELL, N. J.—The town of Caldwell has colonial traditions, and what could be more appropriate than that the new Borough Hall should be built in the colonial style, similar to the charming town halls one sees on a trip through New England villages?

In deciding upon the location of the Borough Hall the Council thought it wise not only to give consideration to this building, but to think in terms of a Civic Center around which the principal buildings of the town would be located. One naturally thinks of a Civic Center as being centrally located, and the intersection of Bloomfield Avenue with Roseland and Westville Avenues is therefore the logical place for this new development. Conditions seem particularly good at this location on account of a small park already there and the fact that there is a certain amount of vacant land available, with inexpensive houses elsewhere on the property. The Civic Center would therefore do two things. It would clear out a number of small, inappropriate buildings, which would be a benefit to the town, and at the same time it would make a very great improvement in the town. All passers-by can see the new development which will provide adequate quarters for the municipal government.



FIRST FLOOR PLAN

This intersection is the most congested spot in town. The building of the Civic Center will provide opportunity to open up the intersection and permit an easier flow of traffic by cutting off the corners of the intersecting streets and easing traffic in and out of them. At the same time, the widening of Roseland Avenue, contemplated by the Essex County Board of Freeholders, will make it the most spacious street in town.

The Borough Hall and Police Court will naturally be the main building of the Civic Center group and will be located on the largest plot of land available facing the park. The Library, while large enough when it was built, has proved inadequate. In its present location it would not be possible to enlarge it, and, furthermore, it would detract from the good appearance of the Town Hall. It is therefore proposed to move the Library intact and enlarge it, placing it in the center of the triangular space formed by Roseland Avenue and Westville Avenue.

At the rear of the Borough Hall and facing on Roseland Avenue would be placed the Fire House. A new Post Office is much needed in Caldwell, and the Government is searching for a suitable site. The formation of the Civic Center is opportune and the Post Office can be made a part of it with advantage to the Government and to the borough. A site has been suggested for the Post Office on Roseland Avenue in the rear of the Library.

Between the rear of the Borough Hall and the Erie Railroad tracks is a large plot of land which can be developed into a civic athletic field. Here athletic meets can be held, baseball and football games can be played by the adults of the town and the school playgrounds will not be interfered with.

Beside the athletic field in the rear of the property, there is room for a large parking space, taking the automobiles of those having business in the Borough Hall off the main streets. At the same time, there is also room for a storage house wherein can be stored much of the equipment of the Street Department, under the close supervision of those in charge, whose offices would be in the Borough Hall.

The material used for the Borough Hall will be red colonial brick trimmed with limestone. The roof will be of green slate and the cupola will be of copper painted white. The other build-

ings around the Civic Center will alsc be built in the colonial style to harmonize with this main building.

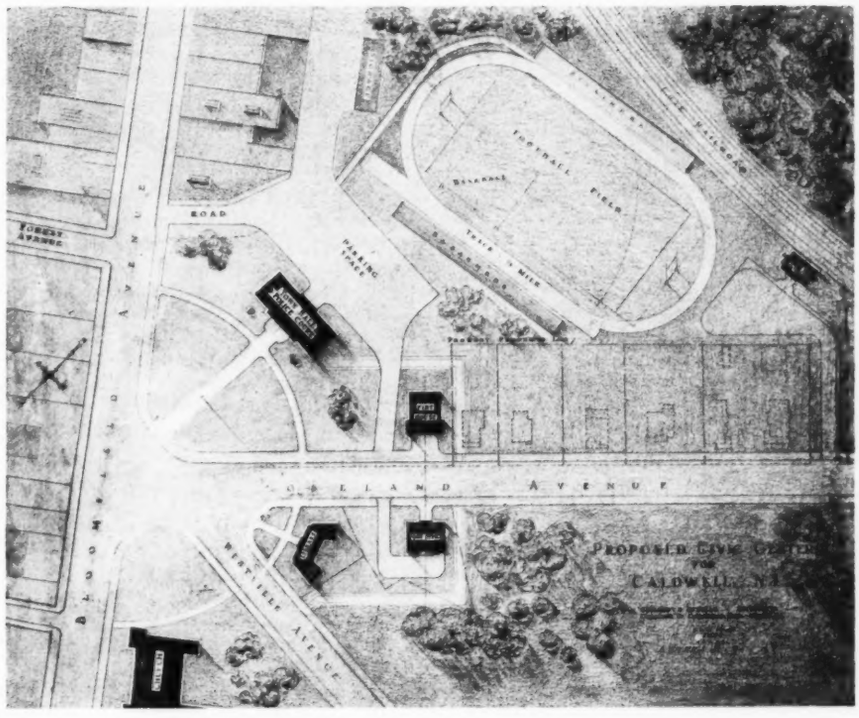
The first floor of the Borough Hall will be arranged as shown on the plan reproduced.

On the second floor, at the center and in the front of the building, will be a large Council Chamber with room for the meeting of the Town Council and space for an audience of 150 visitors. The offices of the officials having most to do with the Council will be on this second floor, such as the Mayor's private office, the Borough Clerk, the Borough Engineer, the Board of Health, and the Building Inspector.

In the basement will be the heating plant, the workshop, and a number of storage vaults for the different officials having offices in the building. There will be a police waiting-room and locker-room, and adjoining this will be a pistol range for the police to use for practice.

The building will be of fireproof construction with simple but appropriate materials used for the finish of the floors, walls and ceilings. It will be dignified both in design and materials used, keeping in mind that it must represent in a proper manner the traditions and aspirations of the citizens of Caldwell.

CHARLES H. BAUER,
Guilbert & Betelle, Architects,
(Newark, N. J.)



Improvements in Houston's Transportation Facilities

HOUSTON, TEXAS.—A railway station project which involves the making of new streets, elimination of old arteries of transportation, and a change of the riverbed of a waterway which bisects the city, is now under way at Houston.

The initial work on the project, which is sponsored jointly by the city of Houston and the Southern Pacific Railway, has just begun, and it is estimated that the change of streets, actual building of the station, purchase of rights-of-way, etc., will cost around $7,000,000. The present station was built more than forty years ago and has probably been "cussed and discussed" by Houstonians more than any other edifice in the city.

The city will open a new street in connection with the improvement work, and will also change the bend in Buffalo Bayou in that part of the city, as a part of its flood-control program.

Since the completion of the Houston Ship Channel, an artificial deep waterway connecting with the Gulf of Mexico, Houston has become one of the transportation centers of the Southwest, with eighteen railroads joining and supplementing its sea commerce. The doubling of Houston's population in the last decade has been due in part to its excellent transportation facilities, and the Southern Pacific is but keeping abreast of the general progress of the city in erecting the new station.

BURT RULE.
Houston Chamber of Commerce.

A Municipal Historian

ROYAL OAK, MICH.—This city, "The Gateway of Eastern Michigan," employs a full-time historian. In anticipation of the approaching centennial celebrations of their communities, various Michigan citizens are busily engaged in writing local histories. The work is being done largely by individuals who have made settlement history their hobby. To date, Royal Oak is the only Michigan municipality known to be underwriting the cost of such historical endeavor.

The new municipal department of history was brought into being through the efforts of City Clerk R. Bruce Fleming. Soon after Mr. Fleming's appointment in 1922, he turned his attention to collecting council minutes, contract documents and agreements, deeds and other valuable records. The task soon became his avocation and claimed his spare moments during the two and one-half years required to complete his collection.

The experience impressed upon Mr. Fleming's mind the importance of gathering and placing all information regarding the origin, growth and development of the community in a suitable repository. Under persistent urging, the City Commission finally acceded to Mr. Fleming's wish, and a City Historian was appointed on February 5, 1929.

OCEAN TRAFFIC ON AN INLAND WATERWAY
Above is shown the Ship Channel by which Houston "fooled the geographers"

Since his appointment, City Historian James G. Matthews has devoted most of his time to research work, occasionally pausing in his duties to prepare folders and advertising matter which have been used for municipal publicity purposes. In this work the city has found his knowledge of the community to be very valuable. The business men of the city, too, have expressed their appreciation of his services in this specialized field.

Inasmuch as Mr. Matthews is also a free lance writer, Royal Oak has received much valuable publicity by reason of special articles which he has written for magazines and metropolitan newspapers. An historical collection which he gathered is on display in the Royal Oak City Hall, and has received much favorable comment. The display is believed to be the nucleus of a historical museum.

Mr. Matthews does not spend all of his time among dusty tomes, or in gathering relics of bygone days. Since his appointment he has been collecting, classifying, and filing historical material of more recent date. His library of local current events and happenings is one of the most complete in Oakland County.

Citizens of Royal Oak, business men, writers, students, city officials, and others are making increasing demands upon the services of the new department. The innovation is being watched with great interest by other Michigan municipalities.

GORDON ORMSBY.

Central Tax Office Saves Money and Annoyance

SCRANTON, PA.—A new departure in the collection of taxes in this city has been accomplished recently, in the centralizing of collection in a central office in the Court House. For years four separate tax collection offices were maintained in three buildings in different parts of the city. Various tax statements, for city, county, school and poor taxes, made up at different times of the year, had to be called for at these separate offices, or sent for, otherwise penalties were imposed. Payments likewise had to be made at the four places. This system caused business men and taxpayers generally an untold amount of annoyance and expense.

To substitute a single office required legislation and the overcoming of strong opposition among politicians. The separate offices were large sources of political patronage; one office alone was good for approximately $50,000. For years it seemed impossible to get the necessary legislation.

Over a year ago the recently reorganized Chamber of Commerce took the matter in hand, having determined that its members considered a reform of prime importance. Through special legislative committees a bill was drawn creating a single office, and by means of determined efforts and careful handling it passed both houses of the Legislature and was signed by the Governor.

Everyone except those directly benefited financially by the old arrangement seems to be very well pleased with the one tax office. Besides a substantial saving in taxes, there are great gains in respect to efficiency, time, energy and lost temper.

Under the provisions of the act the collector keeps separate accounts of the various kinds of taxes and makes monthly reports to the separate units, not only of the taxes collected but also of any interest received on the amounts. The payment of $1,499 interest to the Scranton School District in September, 1930, by Collector Huester, was the first occasion when interest on taxes collected had been turned over to the school treasury. The county will benefit even more than the school or city treasury, and it is estimated that the saving to Lackawanna County will probably reach $50,000 annually.

It is hoped that more legislation will be obtained soon which will make it possible to have the tax duplicates made up at the same time and put together so that all of the taxes can be paid in one check or spaced out in quarterly payments. As it was before, with so many different kinds of taxes, including poll taxes for different governing bodies, no matter how vigilant a person might be, he was likely to miss some of them; then penalties would be imposed, and an alderman (not a legislative officer in Pennsylvania) would get an additional fee for collecting. With this additional improvement the benefits of the new system will be still more evident.

RAYMOND B. GIBBS,
General Secretary, Scranton Chamber of Commerce.

AS EFFICIENT AS A BANK
Interior view of the new Scranton tax office

Street Names Visible at Night

KENMORE, N. Y.—The demand of motorists for a street sign that can be read at night as readily as in the daytime has been met in this village by the type of sign shown in the accompanying photographs. It is of local design and make, having been worked out by the collaboration of Fred D. Luke, electrician, and the undersigned. The sign is the result of much experimenting and thought, and has been given the approval of motorists from all parts of the country who pass through Kenmore on their way to Niagara Falls. It is visible a block away both day and night.

The sign is four-sided, and consists of a stamped steel frame with enameled letters on copper. Over the name of the main street on each sign is hung a mirror, which reflects the light from the electric light above onto the name beneath and is so effective that it is easily read by even swiftly moving vehicles.

The important feature of the sign is that no light is taken from the street lamp except by reflection. It does not in any way affect the illumination of the street, and no extra lamps are necessary. The holder of the mirror has painted on the back the name of the next street in either direction, a feature that has proved invaluable to the traveling public.

WALTER DUCKER,
Village Clerk.

County Requires Improvements as Well as Plats for New Subdivisions

CINCINNATI, OHIO.—Platting regulations which require either the installation of all utilities or, in some peculiar cases, the filing of a petition for utilities in a manner similiar to that already in force within the corporate limits of the city of Cincinnati, were passed by the Hamilton County Commissioners on December 2.

The two sets of rules are practically

identical and differ only on the point of origin of plats and plans, dependent upon whether the plat in question lies within the limits of a village or in the unincorporated territory of the county.

These rules, after giving the definition of a subdivision, the territorial limits of the rules and of jurisdiction, the procedure, the principles and rules for subdivision layout (covering streets, lots and open spaces), the required content of the preliminary plat and that of the final or record plat, contain the following:

General.—All improvements required under these rules shall be constructed in accordance with the specifications and under the supervision of the Board of County Commissioners of Hamilton County and to its satisfaction. The cost of such inspection is to be borne by the subdivider.

Roadways and Sidewalks.—Roadways of bituminous macadam or concrete, constructed in accordance with specifications of the County Surveyor, are considered standard and will be approved. Sidewalks of concrete at least 4 feet wide will be required.

Water Lines.—Where a public water main, in the opinion of the Board of County Commissioners of Hamilton County, is reasonably accessible, the subdivider shall connect with such water main and provide a water connection for each lot.

Where a public water main, in the opinion of said Board of Commissioners of Hamilton County, is not reasonably accessible, the subdivider shall place on file with such Board the prescribed form of petition for the installation of water mains to the full extent to which the entire subdivision is involved in such installation. The withdrawal of such petition will not be permitted. Certification to the effect that such petition has been duly filed with such Board shall be placed on the final plat and included in each deed.

Sewers.—Where a public sanitary sewer, in the opinion of the Board of Commissioners of Hamilton County, is reasonably accessible, the subdivider shall connect with such sanitary sewer and provide a house connection for each lot.

Where a public sanitary sewer, in the opinion of said Board of Commissioners of Hamilton County, is not reasonably accessible, but where the plans for the sanitary sewer system of the district in which the subdivision is located have been worked out by the County Sanitary Engineer, the subdivider shall lay out and construct a system of sanitary sewers in conformity with such plans for the district, even though a connection with an existing sewer main is not immediately possible. In such cases, and until such connection can be made with the sewer system of the district, the subdivider shall provide for the disposal of sanitary sewage by a type of community treatment plant, to be approved by the Commissioner of Health of Hamilton County.

In cases other than the above, the subdivider shall place on file with the Board of County Commissioners of Hamilton County the prescribed form of petition for the installation of sanitary sewers to the full extent to which the entire subdivision is involved in such installation. The withdrawal of such petition will not be permitted. Certification to the effect that such petition has been duly filed with such Board shall be placed on the final plat and included in each deed.

The existence of nearly a dozen subdivisions in which there are no improvements other than the rough grading of ditches along the margin of streets, has led to considerable concern on the part of local health authorities, and their concern in turn has contributed largely to the actual preparation and adoption of the rules.

Another contributing factor is the gradual migrating of Negro population to the outskirts of urban communities throughout the county, as the result of the elimination of tenement buildings in the "basin district" by the Union Terminal Co. and participating railroad companies. It is quite fortunate for the future of the city of Cincinnati that the County Commissioners have adopted platting rules requiring improvements at this critical time.

M. D. DOWNS,
Engineer and Secretary, Regional Planning Commission.

Chamber of Commerce Enables City to Acquire Airport

PENDLETON, ORE.—The Chamber of Commerce of this city is purchasing 160 acres of land to be developed as a municipal airport. The city has, by ordinance, agreed to allocate a certain amount in its budget each year until the entire cost is paid, at which time the Chamber of Commerce will deed the airport to the city. The maintenance and operation costs during the life of the agreement are to be assumed by the city.

It is expected that the airport will be in readiness for dedication during the latter part of 1931. A portion of the land purchased is included in the present Emergency Field No. 48 of the Department of Commerce, on the Pasco-Salt Lake air route, and the field when completed is to be fully lighted for night flying. It will also be designated on the Pasco-Salt Lake air route, and the Central air route to Portland, Ore., via the Columbia River gorge. The entire cost of the contemplated construction will total $30,000.

GEORGE C. BAER,
Executive Secretary.

A Municipal-Civic Co-operative Program

PORTSMOUTH, OHIO.—Following suggestions made at the recent City Managers' convention, we have adopted a new method of keeping the public informed on city activities. Going on the ground that public interest must necessarily be based upon a knowledge of facts, we have sent to the presidents of the various civic organizations a list of subjects on which city officials are prepared to speak. An invitation was extended to such organizations to use this opportunity to become enlightened on city affairs. Indications are that the program committees will take advantage of this offer and place city officials on their schedules.

Heads of the various departments have prepared speeches as indicated:

Mayor:
- Our Interpretation of the Charter
- Operating a City
- City Finances—Operating and Sinking Funds

Vice-Mayor:
- What Your City Government Is Doing

City Manager:
- Municipal Administration—Internal Organization
- Planning for the Future
- Operating Cost Problems

Director of Finance:
- Municipal Finance—A Bird's-Eye View
- Municipal Finance—Your Tax Dollar

Director of Law:
- Protecting the City's Legal Interest

Assistant Director of Law:
- A Tragedy of Error (being a day in Municipal Court)
- Prosecutions a la Carte (a morning in the office of the police prosecutor)

Director of Civil Service:
- Charter Economy

Chief of Police:
- What the Police Department Is Doing

Chief of Fire:
- Fire Fighting

Superintendent of Waste Collection:
- Municipal Housekeeping

Director of Engineering:
- The Department of Engineering and the City Government
- Flood Protection in the City of Portsmouth

Director of Water Works:
- The Water Works Manager's Job
- Pure Water—How We Obtain It

Health Commissioner:
- The Health Department—How It Functions

Librarian:
- How Your Library Serves the Community

A 70-page police manual has recently been prepared and distributed to members of the Portsmouth Police Department. The manual contains, in such form as to be readily used for reference purposes, the material presented by each of the lecturers in the police school held early this winter. Portsmouth is probably the smallest city in the country maintaining a police school and likewise is one of the few cities having their own manuals for the use of police officers.

Feeling thankful that they themselves have secured employment, practically all the 240 city employees recently made donations in the Welfare Drive. This is in marked contrast to the results achieved among city employees in past years. Mayor Robert G. Bryan and the writer stated to employees at the outset of the drive: "It is not the purpose of the Council nor of anyone in authority to mark or measure your line of action, but only as a suggestion do we say that a splendid guide would be at least a minimum of one-half of one per cent of your annual salary."

C. A. HARRELL,
City Manager.

A Municipal Insurance Fund for a Volunteer Fire Department

MORGANVILLE, KANS.—Our ordinance creating a Fireman's Protective Fund is for the service of our volunteer department, which is composed of thirteen men. The city in past years has always carried a group insurance policy on these men, who may be hurt while in line of duty. The premiums have always amounted to quite a little but more than the claims. The city officials thought that by creating a protective fund to take care of any claims which might arise from accident to men on duty, a nice balance would in future be created to the Fire Department. The city set aside an amount equal to the cost of the regular insurance companies' premium, each year. To date the fund has done all that was expected of it. A committee of three, consisting of the Fire Chief, Assistant Chief and Chairman of the Fire Department of the Council, passes on any claims which might arise, and after they approve them the City Treasurer pays the claimant.

DANIEL J. ROENIGH, City Clerk.

Community Organization in Unemployment Emergencies

By **SHELBY M. HARRISON**
Vice-General Director,
Russell Sage Foundation

THOSE who have made careful study of what happened in America during and immediately following the depressions of 1893-94, 1907-8, 1914-15, and 1920-21 tell us: "The time to organize for an unemployment emergency is from three to five years before the emergency. Failing that good start, the sooner the better." Even a casual reading of the recorded experience of earlier crises shows ample justification for this statement. The fact remains, however, that hardly any American community laid plans three to five years ago for the situation confronting it today. Many communities are just now setting up emergency relief and job stimulation committees.

While no one can tell how long the present depression will continue, we do know from an unbroken record of previous experience that the ill effects of the present situation on individuals and families will be felt long after the business situation is improved. The sooner a community begins to organize to counteract these ill effects, the more speedy will be its complete recovery.

There should, therefore, be much of interest and help for those concerned with civic administration, social problems or community welfare in a study just issued by the Russell Sage Foundation under the title "Community Planning in Unemployment Emergencies."* This study, prepared by Joanna C. Colcord, Director of the Charity Organization Department of the Russell Sage Foundation, collates the essence of the recorded experiences of previous unemployment crises. It takes into account also the emergency relief measures at present under way in some 50 cities.

The report describes machinery for emergency relief that can be quickly set up by each community for itself, to function not only in the present situation but in any future emergency as soon as advance signs of such an emergency are apparent and it describes these signs.

Setting Up an Emergency Committee

Where the city government actually represents leadership in a community, Miss Colcord points out, it may well take the initiative in setting up a community organization in an unemployment emergency. Leadership may, however, properly be vested in other hands. There is no doubt as to the need in most cities for some kind of central committee to direct unemployment relief. The extent to which such an emergency committee can do effective work lies in the manner of its appointment, its personnel, organization and energy.

In organizing such a committee, it is well to consider the boards of directors and the professional staffs of the following agencies in each community:

"The public employment office; the chamber of commerce; two or three leading industries; the personnel managers' association; the central labor union; a commercial bank; a savings bank; the city government (the mayor should be an ex officio member of such a committee); the council of social agencies; the family society; the visiting nursing association; board of health; organizations dealing with homeless men; Y.M.C.A. and Y.W.C.A.; Y.M.H.A. and Y.W.H.A.; bureau of vocational rehabilitation; board of education; executive editors of leading newspapers; representative of church federation or similar group.

"The aims of such a committee briefly should be: to gather the facts as to present local conditions in industry; to coordinate the plans and resources of local agencies; to see that all available real work for real wages is distributed to the best advantage; to develop resources for the relief of such of the unemployed as cannot plan for themselves (these will generally take the form of relief in wages for 'made' work, direct relief, and charitable loans); to furnish wise and discourage unwise publicity."

The experience of previous emergencies, Miss Colcord declares, shows that it is much more desirable to utilize existing agencies for relief than to set up new agencies.

The Stimulation of Public Works

Concerning the stimulation of public works, Miss Colcord says: "The difficulties of forcing through new projects in time to be of use is great, and this, together with the inertia of our communities in 'good times,' doubtless explains why a resource so much talked of has been in practice of so little account. A close examination should be made by an emergency committee, however, of all projects under discussion, to discover those for which (a) plans have been already drawn up, (b) money has already been appropriated by the Federal Government, state or municipality, so as to make its effort in a direction that promises some useful outcome."

Preference to Local Residents

There has been general agreement among those who have studied earlier crises that in periods of depression, residents should have preference in employment. Such preference places the responsibility where it belongs, each community taking care of its own. An influx from other communities increases and complicates the relief problem. Moreover, lasting help can rarely be given in a strange community to a man without social ties or resources.

In this same connection, Miss Colcord advocates application for employment as a prerequisite to the extension of relief to an individual, and cites from the Mayor's Committee on Unemployment in New York City the statement:

"We would recommend, more especially in connection with this emergency problem proper, that no person shall be held eligible for any form of public or charitable relief intended to mitigate unemployment who has not registered at one of the public or approved non-commercial employment bureaus for at least a week without being able to secure work. That would at once exclude from participation in emergency relief of unemployment those who, though perhaps in need and worthy of every sympathy, cannot lay claim to being 'involuntarily unemployed through lack of work.'"

The situation in each community must determine whether the bulk of the relief burden in a time of unemployment shall be carried by the private family agencies, supported by contributions directly or through the Community Fund, or by a public tax-supported body—Department of Public Welfare, County Commissioners, Overseers of the Poor, as they are variously called.

Securing the Needed Funds

However the division of work is made, it becomes the duty of the Emergency Committee to do all in its power to secure the appropriation of the necessary funds from taxation, or the raising of needed amounts by contributions, in order to see that the family agencies, public and private, are enabled to increase their staff and their budgets so as to extend their work without permanently disabling themselves.

It should not be forgotten also, that the non-relief agencies—those specializing in health, child care, and recreation, for instance—have an important part to play in an unemployment emergency.

Preparedness for Future Depressions

It would be a real gain to the nation if the groups which have grappled with unemployment this winter would not disband when the emergency is over, but would continue to study and plan how to reduce unemployment of the seasonal and technological variety. They would

* Free to readers of THE AMERICAN CITY while initial edition lasts. See Department of Municipal and Civic Publications, page 179.

then be prepared for the first signs of the next emergency.

Any comprehensive program for study and control of a community's unemployment problem should embrace at least these topics:

- Provision for regular employment statistics
- Development of an effective public employment exchange
- Efforts to induce employers and industries to regularize their own employment
- Long-range planning of public and private works which can be promptly undertaken in a period of unemployment
- Promotion of vocational training and guidance for juveniles
- An industrial program for the handicapped
- Legislation

Where the Chief Burden Falls

Whatever emergency measures are adopted in a time of industrial depression, the major part of the burden will fall upon the unemployed themselves. It is futile to talk about organizing the community to carry the *whole* burden of unemployment, because that would mean replacing by artificial means the enormous wage-loss resulting from widespread depression.

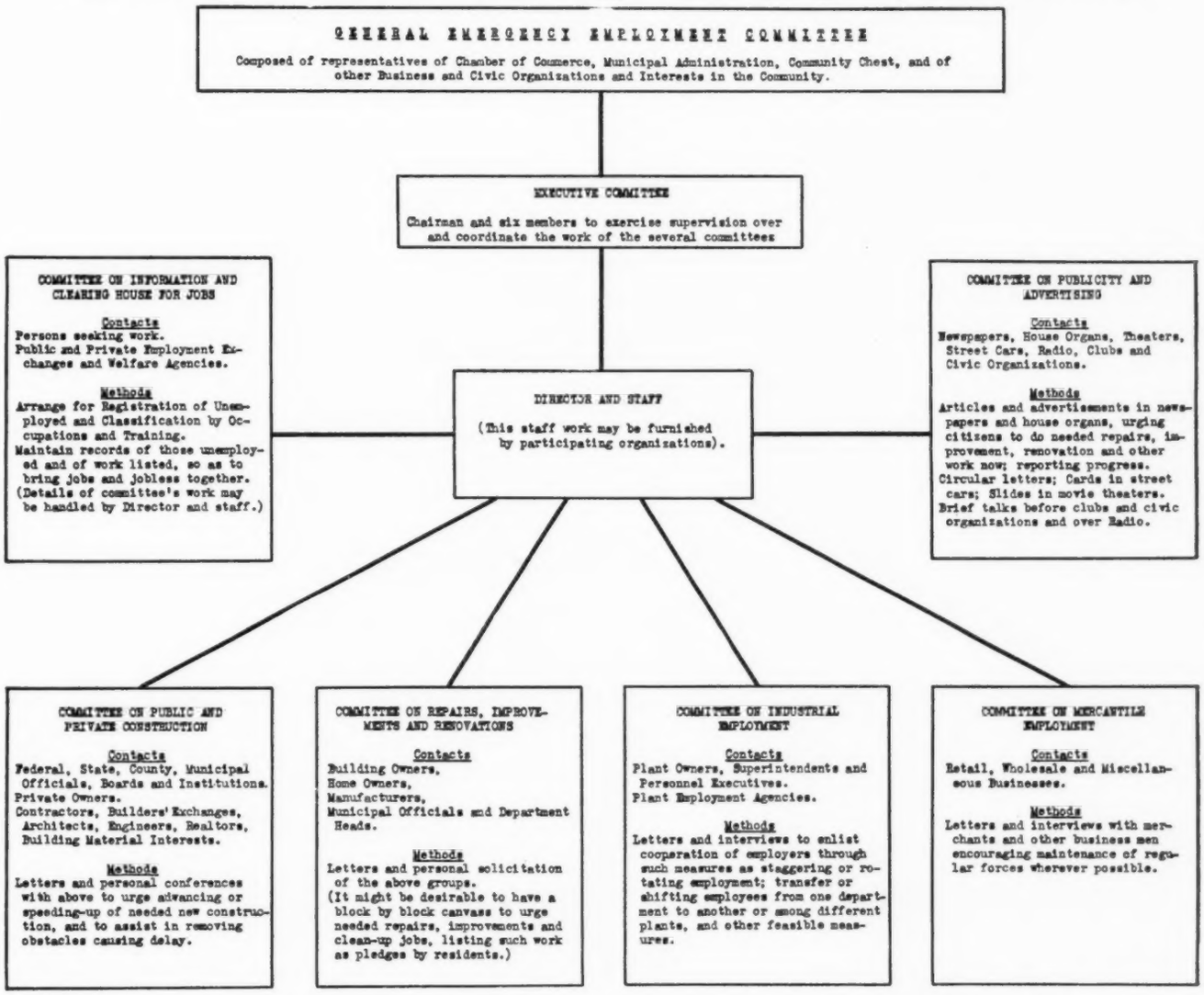
Certain adjustments can be and are made by people who enter the shadow of unemployment. Many of these adjustments are undesirable and the consequences of some will be tragic.

In a hitherto unpublished memorandum prepared for the White House Conference on Unemployment in 1921, the late Mary E. Richmond said:

"The country should be told, in such a way that it will understand, what some of these end results of unemployment are. Homes will be lost in the buying; money will be borrowed on disastrous terms; household effects gathered slowly will be scattered; occupants of separate homes will move into furnished rooms; dwellers in decent neighborhoods will be driven into meaner streets; a lower moral tone will follow upon loss of privacy; lodgers will be taken in who are unfit companions for small children; large families will be insufficiently fed on the two days in the week earnings of one member; children will be taken from school prematurely. These results can be prevented, in part at least, in only one way, and that way is for every individual citizen to get under a part of the burden by doing his best to help throughout this winter—not an abstract best, but the best possible under the circumstances."

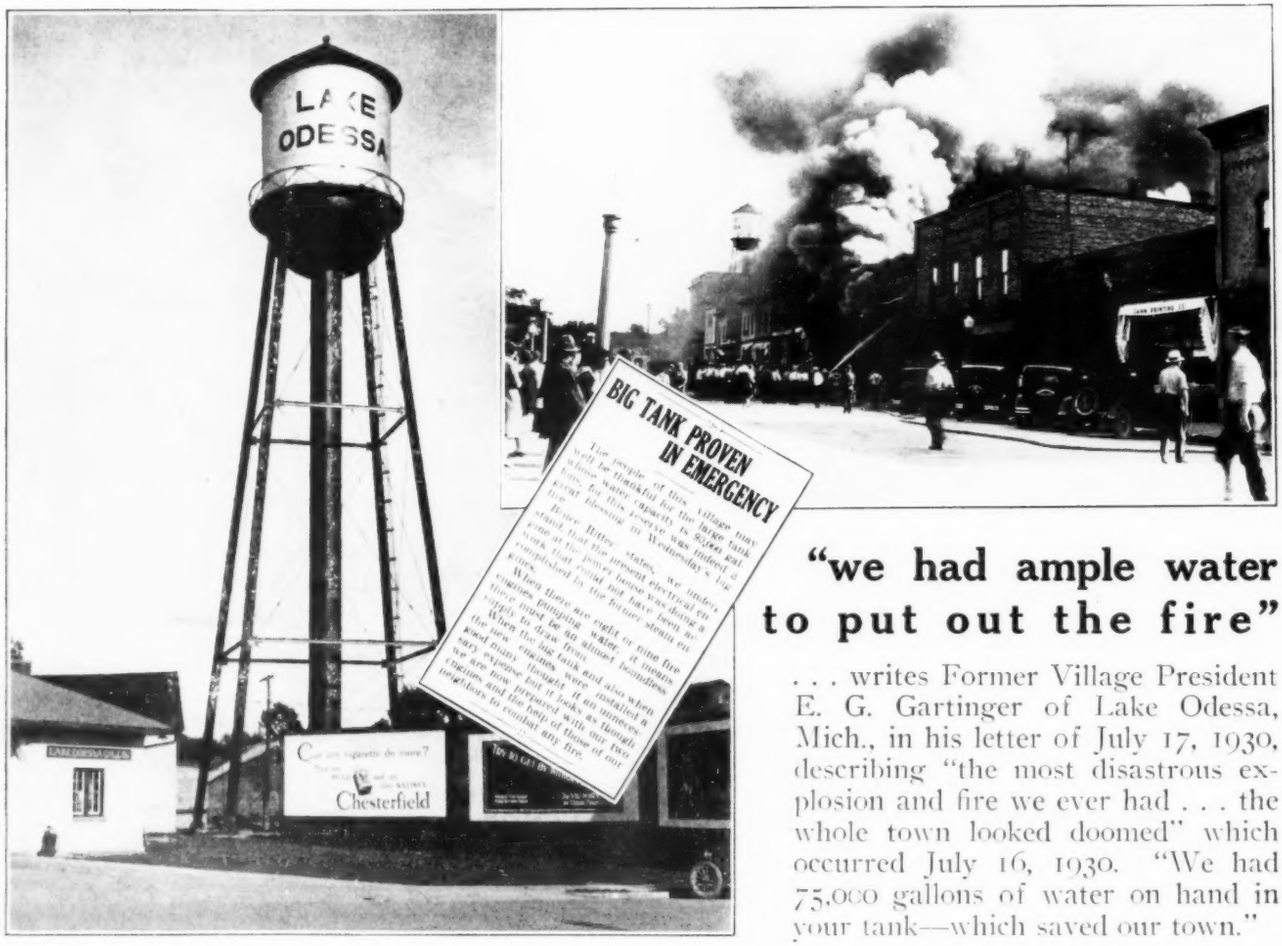
This is as true today as it was in 1921.

National Chamber Charts Set-up for Emergency Committees


GENERAL EMERGENCY EMPLOYMENT COMMITTEE
Composed of representatives of Chamber of Commerce, Municipal Administration, Community Chest, and of other Business and Civic Organizations and Interests in the Community.
EXECUTIVE COMMITTEE
Chairman and six members to exercise supervision over and coordinate the work of the several committees
COMMITTEE ON INFORMATION AND CLEARING HOUSE FOR JOBS
Contacts
Persons seeking work.
Public and Private Employment Exchanges and Welfare Agencies.
Methods
Arrange for Registration of Unemployed and Classification by Occupations and Training.
Maintain records of those unemployed and of work listed, so as to bring jobs and jobless together.
(Details of committee's work may be handled by Director and staff.)
DIRECTOR AND STAFF
(This staff work may be furnished by participating organizations).
COMMITTEE ON PUBLICITY AND ADVERTISING
Contacts
Newspapers, House Organs, Theaters, Street Cars, Radio, Clubs and Civic Organizations.
Methods
Articles and advertisements in newspapers and house organs, urging citizens to do needed repairs, improvement, renovation and other work now; reporting progress.
Circular letters; Cards in street cars; Slides in movie theaters.
Brief talks before clubs and civic organizations and over Radio.
COMMITTEE ON PUBLIC AND PRIVATE CONSTRUCTION
Contacts
Federal, State, County, Municipal Officials, Boards and Institutions.
Private Owners.
Contractors, Builders' Exchanges, Architects, Engineers, Realtors, Building Material Interests.
Methods
Letters and personal conferences with above to urge advancing or speeding-up of needed new construction, and to assist in removing obstacles causing delay.
COMMITTEE ON REPAIRS, IMPROVEMENTS AND RENOVATIONS
Contacts
Building Owners,
Home Owners,
Manufacturers,
Municipal Officials and Department Heads.
Methods
Letters and personal solicitation of the above groups.
(It might be desirable to have a block by block canvass to urge needed repairs, improvements and clean-up jobs, listing such work as pledges by residents.)
COMMITTEE ON INDUSTRIAL EMPLOYMENT
Contacts
Plant Owners, Superintendents and Personnel Executives.
Plant Employment Agencies.
Methods
Letters and interviews to enlist cooperation of employers through such measures as staggering or rotating employment; transfer or shifting employees from one department to another or among different plants, and other feasible measures.
COMMITTEE ON MERCANTILE EMPLOYMENT
Contacts
Retail, Wholesale and Miscellaneous Businesses.
Methods
Letters and interviews with merchants and other business men encouraging maintenance of regular forces wherever possible.

In a recent communication to local chamber of commerce secretaries, F. Stuart Fitzpatrick, Manager of the Civic Development Department of the Chamber of Commerce of the United States, suggests this chart of a community organization and method of procedure for emergency relief of unemployment. The suggested outline, Mr. Fitzpatrick explains, is offered, not as a model, but as an effort to combine the best features of many programs from the viewpoints of simplicity, feasibility, experience and effectiveness in providing local employment.

PITTSBURGH DES MOINES



"we had ample water to put out the fire"

. . . writes Former Village President E. G. Gartinger of Lake Odessa, Mich., in his letter of July 17, 1930, describing "the most disastrous explosion and fire we ever had . . . the whole town looked doomed" which occurred July 16, 1930. "We had 75,000 gallons of water on hand in your tank—which saved our town."

In 1928 the town of Lake Odessa ordered a 75,000 gallon "Pittsburgh - Des Moines" Elevated Water Tank on a tower 91 feet 8 inches high to guarantee a strong gravity pressure—for domestic water supply and for just such serious emergencies as shown above. Lake Odessa secures its water from several small wells, and without the reserve storage supply given by the PDM Tank, their fire fighting apparatus soon would have run out of water in fighting the above conflagration.

Our 48-page Water Works Catalog gives valuable information on the construction, operation and savings effected by elevated steel tanks and standpipes of adequate capacity.

Is your town or manufacturing plant adequately protected with a good water supply?

The "Pittsburgh-Des Moines" organization has been erecting water tanks in all sections of the United States for over 34 years.

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607 Hudson Terminal Bldg., New York City

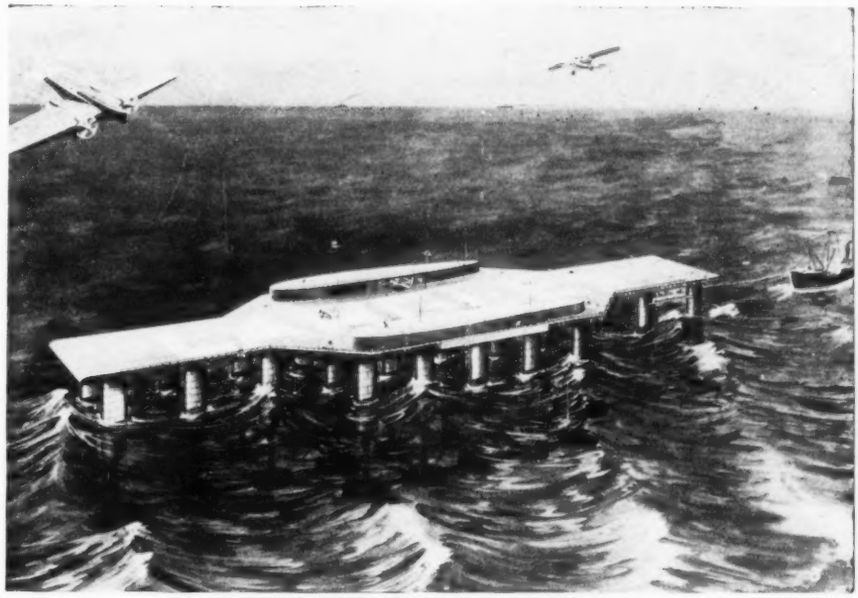
Chicago Atlanta Dallas San Francisco Seattle

AIRPORTS AND AVIATION

A Monthly Department on Aeronautical Activities of Municipal Interest
Conducted by ARCHIBALD BLACK, Air Transport Engineer

Transatlantic Air Mail

CONSIDERABLE attention has been aroused by recent news stories reporting the interest of Pan American Airways, the American operator, and Imperial Airways, Ltd., the British operator, in establishing a transatlantic air mail service between the United States and Europe. The matter has been investigated by each of these companies and has been taken up with the U. S. Post Office Department. W. Irving Glover, Second Assistant Postmaster General, is very much in sympathy with this scheme, although of course its execution involves certain technical difficulties. The obvious impracticability of carrying a pay load on scheduled non-stop flight of 2,000 miles or more is giving rise to some speculation as to the actual details of the plan of operation which will be worked out if this service is put into effect. Announcements to date indicate that Bermuda will be established as one of the stations on the route. Just exactly what method will be used to eliminate the necessity of flying 2,000 miles or more without landing is still uncertain, although the promising possibilities of the Armstrong seadrome naturally suggest that it will be given very careful consideration.



AERIAL VIEW, ARMSTRONG SEADROME
Designed to provide intermediate landing stations for transoceanic air transport

The N. A. C. A. Reviews Progress

THE National Advisory Committee for Aeronautics' 16th Annual Report recently transmitted to Congress by President Hoover stated that commercial aviation is passing through its third fundamental stage of development and is about to enter upon the fourth stage. The first stage was defined as the development of air mail service by the Post Office Department; the second, the operation of air mail lines under contract; the third, the direct encouragement given to air mail contractors; and the fourth is expected to be the carrying of passengers and express as the major portion of the business of airplane operating companies. The Ludington line, which has been operating between New York and Washington, starting last summer, is cited as an example of the possibilities of the airplane in transportation of passengers even where it is necessary to compete with excellent railroad service. This line has adopted for its slogan, "Every hour on the hour," maintaining its departures hourly during the business portion of the day, while its passenger tariff is approximately equal to that of the competing railroads, including the pullman charge.

The Committee's report cited the progress made in the past year, specifically mentioning a 34 per cent increase in airway mileage, 12 per cent increase in miles of lighted airways, 18 per cent increase in airports, 50 per cent increase in transport daily mileage, 67 per cent increase in licensed pilots, and 300 per cent increase in paid passengers, in 1930, as available to date, in comparison with similar periods of the year 1929. This increase of 300 per cent in paid passengers is cited as the most notable development of the year 1930.

Passenger Travel Increases

THE monthly report of the Aeronautical Chamber of Commerce covering air transport operations bore out the comments of the N.A.C.A. regarding the steady growth of passenger transportation. A recent report comparing the first nine months of 1930 with previous years stated that 31 lines carried 255,631 passengers during the first nine months, or nearly 100,000 more than for the entire year 1929. A total of almost 19,000,000 scheduled miles was reported flown during the first nine months, representing a more or less steady increase since the beginning of the year, a peak of 3,000,000 airplane miles having been recorded for the month of July.

Too Many Engineers?

PROFESSOR Alexander Klemin, head of the Daniel Guggenheim School of Aeronautics of New York University, recently issued a warning to the aviation industry regarding the excessive enrollment of students in aviation courses throughout the country. Professor Klemin stated that unless steps were taken to stabilize the number of students enrolling in aeronautical courses, the aviation industry might soon find an excessive number of men trained for technical work in that field for whom no opportunities for placement remain. He pointed out that in his own school the students enrolled for aeronautical engineering were almost three times as many as those enrolled for aeronautical engineering study had the second greatest enrollment at the University. In view of the many ramifications of the civil engineering profession and the considerable number of men engaged in that field in comparison with the still very limited aviation industry, this comparison of student enrollments is startling. Professor Klemin stated that in every previous year no difficulty had been found in placing all the graduates of the aeronautical school; in 1930, however, extreme difficulty has been found in locating positions for those graduated.

Automatic Sprinklers in Hangars

TESTS of experimental automatic sprinkler installations in a specially constructed hangar at the Bureau of Standards were completed this summer and a preliminary report of the findings was made public on August 30. The net result of experiments seems to indicate that the sprinklers were neither as effective as claimed by their advocates nor as ineffective as claimed by their opponents. A variety of tests were made, ranging from slow-burning fire in well-ventilated buildings to extremely fast fires.

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Excels
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A HOT-LAID PAVEMENT WITHOUT A HOT-MIX PLANT

INVESTIGATE AT THE
ROAD SHOW, A-78

WEST PROCESS PAVEMENT COMPANY, Inc.
LOUISVILLE, KENTUCKY

Branch Plant Offices
Harrisburgh, Pa. Richmond, Va.

It was found that some fast fires may burn themselves out-without bringing the sprinklers into operation and that in some cases the upper wings of the airplanes provided a shelter beneath which the fire spread to other parts of the airplane despite the operation of the sprinklers meantime. To counteract this, a suggestion has been made that floor sprinkler installation also be incorporated into the design. Perhaps the most important part of the report is the conclusion that the automatic sprinklers, generally speaking, will give good protection to the airplane hangars and their contents, excepting such of the contents as are involved in the outbreak of fire. The tests were conducted under the direction of a committee headed by Harry H. Blee, of the Department of Commerce, and including representatives of the Navy Department and U. S. Army, Underwriters' Laboratories, Aeronautical Chamber of Commerce, National Advisory Committee for Aeronautics, and others.

Colorado Public Utility Commission

A CONTEST between two airplane companies for authority to engage in the transportation of passengers between points within the state of Colorado has been decided by the Public Utilities Commission, as reported in the *United States Daily* of September 24. The Committee granted a certificate of convenience and necessity to Pikes Peak Air Commerce, Inc., and denied an application of U. S. Airways, Inc. Both companies, the Commission's order shows, are operating under certificates heretofore issued by the Commission. In announcing its decision the Commission stated in its order: "We feel convinced that there is not enough airplane business between Grand Junction and Denver to warrant the operation of two lines between these cities." This decision, so far as the writer is aware, seems to mark an extension of the scope of public service commissions into the aviation field.

Air Mail Cost

WITH the rapid extension of air mail services during the past two or three years, the cost of these to the Government has undergone very rapid increase. Newspaper reports indicate that the domestic air mail service will cost the United State Government approximately $20,000,000 in the next fiscal year, while in addition the Post Office supply bill reported to the House provides $7,000,000 for the operation of foreign air mail services, making the total cost to the Government of about $27,000,000 and representing a substantial increase over the previous year. In considering these figures, of course, it should be noted that the entire amount does not represent loss to the Government, as deduction must be made for the postage collected, which represents an important sum although undoubtedly less than the cost of operating the service. Assistant Postmaster General Glover, questioned by the House Appropriations Committee, stated that the air mail map of the United States is in his opinion practically complete for the time being. The estimated loss to the Government in the operation of the air mail service after applying postal revenue against contract payments for the year 1930 was given as $13,864,174, while the total postal deficit for this period is reported at about $15,000,000. The new appropriation contracts would cover two additional foreign air mail services and eight domestic lines in addition to those at present in operation.

Fire Hazard from Radio Apparatus

THE Liaison Committee on Aeronautic Radio Research recently held a meeting at the office of the Aeronautics Branch of the Department of Commerce in Washington to consider several questions relative to aeronautic radio research. Among these was the possibility of fire hazard resulting from the operation of high-frequency radio transmitting apparatus located in the vicinity of airplane fueling areas. The committee issued a warning to airport operators cautioning them against the refueling of airplanes in the proximity of high-frequency radio transmitters and against the operation of radio transmitters on aircraft while nearby aircraft is being refueled.

Engineers' Airport Surveys

A PRELIMINARY announcement reporting progress of the Committee on Airport Surfacing and Drainage organized by the Department of Commerce, the American Engineering Council and the American Road Builders' Association was reported in the *United States Daily* the latter part of November. Colonel Harry H. Blee is quoted as stating that the subcommittees are now filing their reports covering analyses of requirements, soil conditions and weather—the membership of the local committees throughout the country totaling between 500 and 600 engineers and airport specialists. The study covers practically every section of the country and is expected to provide the basis for general recommendations for airport surfacing and drainage. In addition to the studies of the local committees a national inspection tour has been made by Fred E. Schnepfe, special research engineer of the American Road Builders' Association. On account of the necessity of devoting considerable time to coordination of the reports, it may be several months before the Committee's final report becomes available.

Airship Merchant Marine Proposed

ON December 4 a revised draft of the airship merchant marine bill was introduced in the Senate by Senator Charles L. MacNary, of Oregon, and Representative James S. Parker, of New York, introduced a similar bill in the House. The bill is intended to encourage the construction of American airships for regular operation on foreign trade lines by American operators. Senator MacNary pointed out that this country has the only substantial supply of helium, making it highly desirable that the United States assume leadership in developing this new type of transportation. The bill follows the long-standing precedent of encouragement and protection of American mercantile marine. Airships, to be eligible for mail contracts under this bill, must be capable of carrying at least 10,000 pounds of mail in addition to a substantial commercial load over distances in excess of 2,000 miles. In his statements to the press, the Senator pointed out that three projects had already been announced, including the Pacific Zeppelin Transport Company's proposed Pacific Coast Hawaiian service; The International Zeppelin Transport Corporation's proposed trans-Atlantic service; and the Aircraft Development Corporation's proposed airship service in the Carribean.

Stewardesses on Boeing Planes

A RECENT news release of the Boeing Air Transport system described an interesting experiment being made on its Chicago - San Francisco passenger airplanes. The Boeing has engaged ten young ladies and is now conducting an experiment of utilizing them as stewardesses on the passenger transport airplanes operated over this branch of its lines. The stewardesses serve lunches, supply reading and writing material, send telegrams, dispatch letters and make themselves generally useful in the way of rendering such services to the passengers.

National Aircraft Show for 1931

CHARLES L. LAWRANCE, Chairman of the Show Committee of the Aeronautical Chamber of Commerce of America, recently announced to the members of the Chamber that the National Aircraft Show for 1931 would be held in Detroit, Mich., in cooperation with the Detroit Board of Commerce. The response to this announcement is stated to have been highly satisfactory and Ray Cooper, Show Manager, has announced that about 60 per cent of the available space has already been contracted for. The show is planned to be held at the Detroit Municipal Airport, early in April.

Regional Planning

"Regional planning is, it seems to me, a stirring challenge to all of us. It is an acid test of how far we are the captains of our fate. Planning under a democracy is a determination by the majority of the way in which they desire their community to develop. Regional planning is a hand on the rudder of evolution; it is our hope for definance of chaos and blind chance; it is our determination to hold fast to the good that we have and develop it equitably, for the good of the future. Our liberty to do this is the greatest and noblest liberty we possess."

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THE TAXPAYER'S DOLLAR

A Monthly Department of Budgeting, Assessment, Taxation, Accounting and Other Phases of Municipal Finance Conducted by A. E. BUCK, National Institute of Public Administration, New York

New York City Adopts Budget for 1931

NEW YORK CITY'S budget for 1931, as finally adopted, totals the huge sum of $620,840,183.37. And this is not all the expenditure authorizations for the period; others for improvement projects will be voted later. The grand total, before the year is over, will probably exceed eight hundred millions.

The budget seemed to stir up more citizen interest this year than had been the case for some time. A score of civic and business organizations issued a protest against the size of the tentative budget when it was up for public hearings about the middle of October. Peter Grimm, President of the Real Estate Board, presented the case for these organizations before the Board of Estimate and Apportionment. The major complaint was lodged against the present method of subway financing under the so-called Delaney plan, which requires about fifty millions of dollars to be provided by the current budget. Other objections to the budget were raised, but they were not backed up by sufficient facts to meet the Mayor's challenge.

The proposed budget was under consideration before the Board of Estimate and Apportionment and apparently scheduled to go through without change, when almost by accident it was discovered that the five Borough Commissioners of Public Works had had their salaries boosted $3,000, making the annual salary of each $15,000. This had apparently been done in an executive session of the Board, despite the fact that the pay of these officers had been raised from $10,000 to $12,000 only a month or so before. Other salary increases had been inserted, so that the total increases amounted to about $225,000. Most of the newspapers in the city vigorously assailed the tactics of Mayor Walker and the Board of Estimate in making these salary raises. The Board again went into executive session, and upon adjournment the Mayor announced that the salary increases which had been quietly put into the proposed budget had been eliminated. The Mayor also tried to explain that these items had been included merely for discussion.

The proposed budget was adopted on the last day of October by the Board of Estimate and was sent to the Board of Alderman for approval. Apropos of this, the *New York Times* said editorially:

"After a stormy three weeks, the Board of Estimate has finally adopted the 'budget' and turned it over to the mercies, usually tender enough, of the Board of Aldermen. . . . For the first time in many years there has been a fairly lively discussion of city finances, particularly where they impinge on subways. Civic and commercial organizations have come together into a group which could do a great deal during the next twelve months if it were vigorously led and competently advised. They have learned that it is useless to try to reduce taxes at the eleventh hour."

On November 12, Comptroller Berry announced that the basic tax rate of the city for 1931 would be $2.69, an advance of 16 points over that of 1930. Even this announcement failed to stir the lethargic Board of Aldermen. Two public hearings were held on the budget by the finance committee of this body, one on November 17, and the other on November 21. At the first hearing three professional civic workers spoke, and they became involved in arguments with each other over assessment and bond matters. No one appeared at the second hearing. On November 25, the Board of Aldermen approved the city budget as sent to it by the Board of Estimate, without so much as dotting an "i" or crossing a "t." The final vote was 59 to 3. Alderman Joseph Clark Baldwin, 3d, voiced the only opposition to the approval of the budget. He spoke of the tremendous increase in the cost of the city government and recommended that certain steps be taken in an attempt to hold down this cost, such as departmental reorganization, a policy of long-term financing, prohibition of lump-sum appropriations, reclassification of salaries, elimination of salary increases between budget periods, revision of the pension systems, and a survey of city properties.

Chicago Borrows Again

THE State Legislature has given the Chicago Board of Education a distinct status for the purpose of borrowing so that it can henceforth obtain loans independently of the city itself. Its first issue of $12,500,000 of 4 per cent revolving fund bonds, due from 1932 to 1936, was sold on November 14, 1930, at a price of 98.8477. The proceeds of this new financing will be used mainly for the payment of teachers' salaries. The total amount of the revolving fund, as authorized by the State Legislature, is $25,000,000. This financing is the first of its kind. Hitherto the Board of Education has issued no bonds except by authority of the City Council. The Board's building program has been met from the proceeds of a building tax, and its finances have been handled through the city authorities.

During November, 1930, the city of Chicago issued $12,000,000 of 4 per cent revolving fund bonds. Cook County, which includes the city of Chicago, issued $6,500,000 of 4 per cent revolving fund bonds. The Chicago Sanitary District also issued $500,000 of 4½ per cent bonds due in 1950.

It is the opinion of those who deal in "municipals" that with the large number of separate debt-incurring units in Chicago the bond market is being greeted with a succession of Chicago issues, driblets from each unit. It is therefore fair to assume they say, that the average price received for bonds in this fashion is less than if the city borrowed under its own name annually or semi-annually.

Philadelphia Has a Budget Muddle

ACCORDING to the Philadelphia Bureau of Municipal Research, the Council of that city is facing a most difficult and embarrassing situation in its task of considering the annual budget and fixing the tax rate for 1931. The city government, so the Bureau states, will end 1930 with "an enormous deficit," amounting to ten or twelve million dollars. This is due mainly to four causes: (1) the unwarranted reduction in the tax rate last December from $1.95 to $1.80; (2) the marked increase in tax delinquency this year; (3) the under-estimate by the City Controller of the deficit of 1929; and (4) the over-estimate by the City Controller of the city's receipts this year from the Broad Street subway. About $10,000,000 more of revenues will be required in 1931 for sinking-fund and interest charges than was applied for these purposes during 1930. This increase, so the Bureau says, arises from (1) the inability of the city to take advantage of any large amount of sinking-fund surpluses next year, whereas about $7,000,000 of "surpluses" were used in reduction of appropriations this year, (2) the inability of the city to pay interest and sinking-fund charges on Broad Street subway bonds out of the proceeds of bond issues in 1931, whereas about $2,500,000 of such charges were thus met in 1930, and (3) increases in debt charges resulting from new bond issues.

It appears that the budget submitted by the Mayor to the City Council is quite lacking in the essential details which will permit that body to pass judgment on its recommendations. The Bureau claims that the Mayor's budget does not meet the requirements of the city charter as to the form. Not wishing to raise the tax rate too much, the Mayor slashed the estimates of his departmental heads, thus reducing the total budget to a point where probably a 15-cent increase in the tax rate will suffice. The slashing was done mainly in the items for personal services, but no detailed schedules were presented to show what salaries had been increased or what positions had been eliminated. The Council will be unable to secure this information within the time at its disposal. It will therefore have to make appropriations for personal ser-

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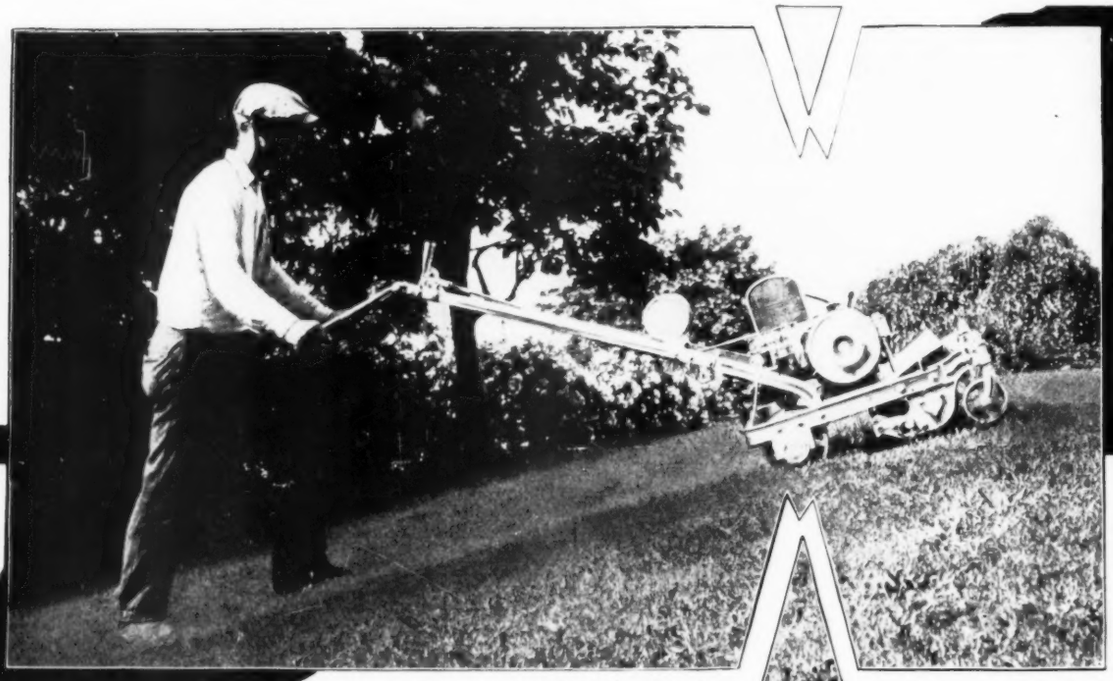

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vices without detailed schedules, in which it may be charged with extravagance or loss of legislative control. The Bureau thinks this leaves the Council "on the horns of an unfortunate dilemma."

St. Paul Adjusts the Salaries of Its Employees on the Cost-of-Living Basis

MAINLY through the efforts of J. B. Probst, Chief Examiner of the Civil Service Bureau of St. Paul, Minn., a system was adopted in 1922 through which the salaries of city employees are adjusted to the cost of living. The basic entrance salaries, which are the compensations deemed adequate to meet the living conditions that prevailed in 1916, are adjusted the first of each year on the basis of the latest available index on the cost of living in St. Paul or in the vicinity, as prepared by the United States Bureau of Labor Statistics. The actual percentage of increase so determined constitutes the adjusting percentage applicable to the standard salary rates.

The original standardization in 1922 provided for a 50 per cent increase over 1916. This adjusting increase was changed to 52 per cent on July 1, 1924, and to 53 per cent on January 1, 1927. On January 1, 1928, however, there was a decrease of 3 per cent, bringing the adjustable percentage back to 50. Another decrease of 3 per cent was made on January 1, 1931, bringing the adjustable percentage down to 47. During the past eight years, therefore, there have been four changes in the adjusting percentage—two of them upward and two downward. Mr. Probst says that the city employees on the whole are well satisfied with this salary plan, that there is greater contentment among the employees under this plan than ever before, and that the officials of the city have been singularly free from wage controversies.

The standardization ordinance at first provided for affirmative action on the part of the City Council to put into effect any increase or decrease to meet the changes in the cost of living. Later this was revised and a provision added which puts the increase or decrease into effect automatically on January 1, following an actual change. Mr. Probst says that there was some recent agitation on the part of employees to have the Council nullify this automatic adjustment. But C. P. Herbert, Director of the local Bureau of Municipal Research, prevailed on the members of the Council to allow the automatic decrease for 1931 to go into effect.

Standards for Judging Municipal Bonds

THE Chemical Securities Corporation, affiliated with the Chemical Bank and Trust Co., recently issued a set of standards for judging municipal bonds. We believe these standards are of sufficient interest to our readers to reproduce the summary in full.

"Is the municipality permanently established with its position economically justified? This involves the question of its nature, whether agricultural, industrial, mercantile, residential or any combination of these characteristics.

"Is the municipality progressing or declining? Size, density, character and growth of population, diversity and size of industries, the wealth of the community, banking accommodations and deposits, natural resources, transportation facilities, and like factors should be considered.

"Is the past record of the community as to government and debt service above reproach? In other words, have previous administrations ever repudiated, defaulted, deferred, or compromised the settlement of any debt, and if so, under what circumstances?

"Do the laws of the state in which the community is located protect the bondholder? This is a matter of both record and history, which requires careful investigation and analysis.

"Is the taxing power limited or, if limited, does the power within the limits seem adequate? This is also a point involving both law and history. Generally speaking, limited taxation for the payment of indebtedness is considered unsound practice.

"Are the bonds a direct obligation of the municipality backed by its full taxing power? Some municipals are actually payable from special assessments levied against the property benefited; others, known as revenue bonds, are payable solely from the earnings of water works, electric light and, in some instance, street railways.

"What relation does the debt bear to the assessed valuation, and what relation does the assessed valuation bear to true valuation? Many municipalities with high tax rates have low assessments, and vice versa.

"What is the total debt burden of the municipality, including overlapping debt? Not only the indebtedness of the municipality itself, but also the aggregate of the indebtedness of all county, school district and other political subdivisions, require careful and competent analysis.

"Have all laws and limitations been observed in the issuance of bonds and is there any question as to the validity of the obligations? This is purely a legal question, which calls for an opinion by a competent legal authority."

Ohio County Budget Commission Fails

THE Citizens League of Cleveland claims that, so far as Cuyahoga County is concerned, the County Budget Commission in Ohio has failed completely as a reviewing and supervising agency of the local budgets. The Ohio law constitutes the County Budget Commission, consisting of the County Auditor, County Treasurer, and Prosecuting Attorney, whose duty it is to review the budgets of all taxing units within the county and see that reasonable tax rates are maintained in financing these budgets.

The League states that the Cuyahoga County Budget Commission held only two brief sessions during November, 1930, gave no consideration to the details of the claims of the taxing units, made no examination into the methods of budget-making in the various political subdivisions to see how they determined their needs, but proceeded to allocate to the county, city, city schools and other taxing units millions of dollars of public revenue on the basis of the arbitrary divisions set up a year ago under similar hurried circumstances. It therefore characterized the County's Budget Commission as being "merely an automatic adding machine which registered last year's defective distribution as the basis for this year's allocation of funds."

The League says that the present composition of the County Budget Commission—three county officers with no representation from the city or the schools—is far from ideal. But it holds that these restrictions place no hindrance in the way of these three county officials if they really want to adopt and enforce sound budgetary methods in the 102 taxing units of Cuyahoga County.

Tax Exemptions and Tax Collections in New York City

A MOVE on the part of the City Department of Taxes and Assessments to impose a tax on the 68-story Chrysler Building, built on land owned by Cooper Union, which claims exemption on all its property under a 70-year-old statute, has started a discussion of the whole question of tax exemption. The amount of tax-exempt property in New York City now reaches $5,118,884,005. This is more than a fifth of all the assessable property in the city. Churches, hospitals, and other philanthropic enterprises are said to account for only $878,001,334 of this amount. Practically as much is temporarily exempted under the housing law. The rest represents public property, such as government buildings, prisons, schools, parks, playgrounds, and the like, which are regarded as "non-taxable."

There has been some speculation as to the effect of the present depression on tax collections in New York City. It is reported that on March 1 annually for a period of 25 years the uncollected taxes of the previous year's levy amount to about 10 per cent. By the end of the year, this is generally reduced to about 4 per cent, and in the next succeeding year to about 1½ per cent.

Unpaid taxes on lands and buildings for all years prior to and including 1928 amount to $30,000,000 in round figures, of which $14,400,000 is deemed to be uncollectible. Discounts allowed under the law for the prepayment of taxes, cancellations resulting from errors, compromises and litigation, constitute a large part of this latter total. The biggest item of uncollected taxes is in the personal property tax. Less than 20 per cent of this tax is collected, so that the arrears amount to about $55,000,000, practically all of which is uncollectible.

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Public Administration Clearing House Organized for Special Service in the State and Municipal Fields

ANNOUNCEMENT has been made from Chicago of the establishment of a Public Administration Clearing House, having for its purpose an effort to contribute toward a more complete and rapid interchange of knowledge in the field of public administration and to bring about a closer and more effective cooperation among public administrators, research units and technical experts in the field of municipal and state administration.

The trustees of the Clearing House, which is incorporated under the laws of Illinois, are: Newton D. Baker, former Secretary of War; Frank O. Lowden, former Governor of Illinois; Henry Byrd, former Governor of Virginia; Richard S. Childs, President of the National Municipal League; Chester H. Rowell, and Louis Brownlow, Municipal Consultant of the City Housing Corporation.

Edward W. Beatty, President of the Canadian Pacific Railroad, also has been asked to serve on the Board and is considering the request. The first meeting of the Board is being held in Cleveland on December 31, at which time it is expected that an announcement will be made that the Clearing House has been financed for a period of ten years for a budget of $50,000 annually. It is understood that Mr. Brownlow will be chosen as the Executive Director of the new institution.

The chief purpose of the Clearing House will be to act in cooperation with existing organized bodies of public administrators, and municipal research agencies. It will confine its activities to the administration field and will advocate no particular form of governmental organization nor support specific political plans proposed for the remedy of administrative ills. It will not undertake to render technical advisory service to public officials or citizen groups or to make administrative surveys.

In the prosecution of its activities, the Clearing House will guard against invasion of the fields of other organizations, and the duplication of existing facilities, its province being that of coordination and cooperation in the common interest and for the common advantage.

In order to protect and strengthen the special organizations of officials, of legislators, of administrators, of researchers, and of similar groups, the Clearing House will not normally deal with their members or potential members without the request of, or notice to, the appropriate secretariats.

From time to time advisory committees will be selected by the Board of Trustees from technicians in the field to advise with the Director as to the course of the work.

The first undertaking of the new organization will be to make a survey and classification of all the existing organizations in the United States and Canada in the field of administration.

The Municipal Bond Market

By SANDERS SHANKS, JR.
Editor, *The Bond Buyer*

SINCE the first of October the trend of bond prices has been steadily downward. The sharpest drop occurred during the first half of December, when heavy liquidation of bonds appeared to be due to bank selling. In this sudden collapse of bond values, Federal Government and municipal securities have suffered less than other descriptions. As of December 15, *The Bond Buyer's* index of high-grade city bonds was down about 3½ points from the year's high. The *New York Herald-Tribune* bond averages as at the same date showed a drop of 4.41 points for high-grade railroad issues, 9.18 points for second-grade rails, 5.03 points for industrials, and 4.87 points for public utilities.

Why the Bond Market Has Not Improved

In recent weeks the technical position of the municipal bond market has not improved. Together with a slack investment demand, there has been an increase in the volume of new issues coming on the market. At the same time, the acute banking situation has discouraged bond underwriters from expanding their commitments in new bonds as, normally, they would do at this time in anticipation of the January 1 reinvestment demand. As this is written (December 15), it would appear that municipal bonds will close the year 1930 with prices but slightly higher than they were on January 1. The volume of borrowing for the year will aggregate something like $1,400,000,000 and may equal last year's total of $1,442,000,000. Dependent somewhat upon market conditions, volume of new borrowing for several months into the new year should be large, the amount of authorized, but unsold, bonds having been augmented by the approval in recent months of close to $500,000,000 of new issues.

Philadelphia's Recent Experience

Philadelphia's experience with a $15,000,000 issues of 4¼ per cent bonds for which bids were invited on December 15 illustrates how seriously the market for even the highest grade municipal obligations was affected by bank closings, the stock market disturbance and other evidence of financial uncertainty last month. Under the law, Philadelphia bonds may not be sold below par. When the offering was announced about the first of the month, it was entirely reasonable to assume that an award would be made at a substantial premium. So abruptly did bond prices fall, however, that on the day of sale the city found itself with only two bids from bond houses. One tender, which was for $1,000,000 bonds at par, was accepted; the other, a conditional offer for $5,000,000 with a 60-day option on the balance, was rejected. A small block of bonds was also sold to the sinking-fund. The city announced that it would conduct an over-the-counter sale in order to dispose of the balance of the issue, as the proceeds of the loan were badly needed to meet current obligations. Within a day or two, however, bond market sentiment improved, dealers found that they could sell the city's new issue to investors at a premium of about a point, and their subscriptions, together with those of local financial institutions, quickly absorbed the $12,525,000 unsold balance of the original offering.

The following table, giving the details of recent sales of new issues, will indicate the current level of municipal bond issues:

Amount	Municipality	Rate (%)	Maturity	Net Basis (%)
$100,000	Haverhill, Mass.	4	3½-yr. (avg.)	3.59
6,500	Jefferson Co., Ind.	4½	5½-yr. (avg.)	4.04
1,131,000	Baltimore, Md.	4	14 5/6-yr. (avg.)	4.12
100,000	Portland, Ore.	4½	12-yr.	4.26
95,000	Rock Island, Ill.	5	5-yr.	4.34
35,000	Pittsford, N. Y.	4½	4 2/3-yr. (avg.)	4.45
60,000	Sayreville, N. J.	4¾	2-31-yr. (ser.)	4.63
23,250	Mansfield, Ohio	4¾	3 1/3-yr. (avg.)	4.68
1,000,000	Austin, Texas	4¾	19-yr. (avg.)	4.71
180,000	Winchester, Ky.	5	20-yr.	4.82
75,000	Berkeley Co., S. C.	5	15 1/3-yr. (avg.)	4.99
223,000	Salisbury, N. C.	5¼	14 1/3-yr. (avg.)	5.18
130,000	Aitkin Co., Minn.	6	10 1/3-yr. (avg.)	5.93

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Prepared by
FRANK B. WILLIAMS
Author of "The Law of City Planning and Zoning"

ZONING and PLANNING NOTES

From Data collected by the Zoning Committee of New York (233 Broadway)

Recent Zoning Ordinances

CALIFORNIA.—Whittier, November 24, 1930.
NEW JERSEY.—Riverton, September 11, 1930.
NEW YORK.—Islip, April 11, 1928.
NEW YORK.—Ossining, July 21, 1930.
NEW YORK.—Port Chester, December 1, 1930.
NEW YORK.—Tarrytown, November 24, 1930.

Filling Station

ALABAMA.—*City of Tuscaloosa v. Standard Oil Co. of Kentucky*, 130 So. 186.—A filling station is not a nuisance *per se* even in a residential section, but may be such as operated, under particular circumstances or in particular locations.

EDITORIAL NOTE.—Of course filling stations may be excluded from residential districts under properly drawn zoning ordinances.

Parks

CALIFORNIA.—*Vale v. City of San Bernadino*, 292 Pac. 680.—A society of pioneers had erected on land dedicated and accepted as a public park, a log cabin, also used by the Grand Army of the Republic, the Women's Relief Corps, and the Spanish-American War Veterans. The society was private, and had exclusive control of the building. It refused permission to fifty citizen pioneers to use the log cabin one night a week for the purpose of organizing a rival Pioneer Society "for the reason that the old pioneers concluded * * * that the granting of such application would lead to dissension instead of harmony among the pioneers," but invites them to use the building as often as they like, as individual pioneers. *Held*, that the above use was incidental to a park use, and therefore proper.

NOTE BY EDITOR.—This decision would seem to be contrary to the great body of sound precedent.

Highways

ILLINOIS.—*Gerstley v. Globe Wernicke Co.*, 172 N. E. 829.—The public is entitled to uninterrupted, unimpeded and unobstructed use of every part of public streets and alleys. This includes not only the surface but the air space above it for unobstructed access of light and air.

A municipality has no power to grant exclusive use or control of any part of the highway to private persons for any private purpose. A bridge over a highway, to provide communication between private buildings for employees and customers, may therefore be enjoined.

NOTE BY EDITOR.—Municipalities often give abutters on streets a permit to encroach, with buildings, upon the sidewalk in front; but such encroachment may at any time be ordered removed without compensation.

Eminent Domain

IOWA.—*Butterworth v. State Highway Commission*, 232 N. W. 760.—The condemnation statute provided that no ground should be "taken for the rounding of a corner where the dwelling house, lawn and ornamental trees connected therewith are located at such corner, except by the consent of the owner thereof." In this case the plan was to make this part of the road a very wide curve, leaving about 40 acres in the point, on which the plaintiff's dwelling house, barns and outhouses, lawn and ornamental trees are located; these improvements being thus cut off from the rest of plaintiff's farm. *Held*, that this was "rounding the corner" within the meaning of the statute, and could not be done in this case without plaintiff's consent.

Zoning—Statutory Requirements

KANSAS.—*Armourdale State Bank v. City of Kansas City*, 292 Pac. 745.—The statutory provision that an ordinance changing the classification of property as previously zoned must first be considered by the planning commission or a special commission is valid, and any such ordinance not so considered is void.

Private Covenants—Racial Discrimination

KANSAS.—*Clark v. Vaughan*, 292 Pac. 783.—Plaintiff and others similarly situated four years prior to the bringing of this action had entered into a restrictive covenant with the parents of the defendant not to sell, devise, convey, lease or sublease certain realty owned by them within fifteen years to Negroes. *Held*, that changes in the neighborhood justified the finding that enforcement of the covenant by injunction would be inequitable; and the parties are therefore left to their remedy at law.

A party to a restrictive covenant is entitled to his rights thereunder regardless of the extent of his injury, provided its enforcement will not be inequitable.

Non-Conforming Use

MASSACHUSETTS.—*Town of Lexington v. Bean*, 172 N. E. 867.—A zoning by-law of a town is not unconstitutional for lack of notice and opportunity to be heard.

Property owners can raise objection to a zoning by-law because of lack of notice and opportunity to be heard only as they are affected by any alleged irregularity.

Where, before the passage of a zoning by-law a building was used for repairing motor vehicles belonging to the owner as incidental to his trucking business, the use of the building for the repair of automobiles for pay is not an "existing use" exempted from the zoning law.

Filling Station—Mandamus

MISSISSIPPI.—*City of Jackson v. McPherson*, 130 So. 287.—Petition for mandamus to compel the governing board of the city to grant a building permit for a filling station, in a district which the board had zoned as residential, on the ground that it was unreasonable to zone it as residential. The lower court, granting the mandamus, was reversed on the ground that the writ will not be issued to direct an inferior tribunal (in this case the Municipal Council) to decide an issue of fact in a particular way, when this tribunal is invested by law with original jurisdiction to decide the question.

Where the statute gives the right of appeal from the decision of a board, this is ordinarily deemed an adequate remedy so as to preclude the issuance of mandamus on the ground of lack of such remedy.

Abutting Property

OHIO.—*Messinger v. City of Cincinnati*, 173 N. E. 260.—Property at the end of a street sought to be vacated is "abutting" property requiring publication of ordinance where owners' consent is not filed. "Abutting" means to end, to border on, to touch, and includes any property that abuts or adjoins.

Outdoor Advertising

The City Club of Denver has printed the report of its City Planning Committee on "Outdoor Advertising." It is their Pamphlet No. 19, dated June 1, 1930. It finds that "outdoor advertising may be classified in three main groups: (1) organized outdoor advertising, which consists of large, standardized billboards operated and maintained by concerns specializing in this field; (2) unorganized outdoor advertising, which consists of the heterogeneous display of signs of all kinds and sizes placed by individuals and firms; (3) signs advertising business directly on the premises where the business is conducted."

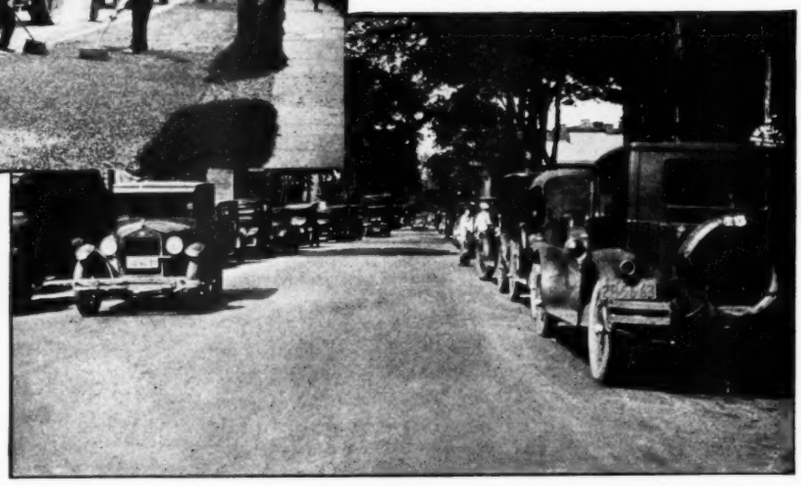
Numerically, the first group is the smallest. A national outdoor advertising concern recently conducted a sign census on 15 highways in Washington. This showed 5.2 per cent of the signs to be in group 1; 25.7 per cent in group 2; and 69.1 per cent in group 3. This calculation, although suggestive, is of course based upon the investigation of an extremely small portion of the entire field.

The report points out that "mere numbers cannot tell the whole story. One large billboard placed in the midst of a pleasant rural vista conceivably might be far more objectionable than a score of small signs."

The report then goes on to discuss the evil of objectionable outdoor advertising and the proper remedies.

Pave and Save with ASPHALT

Salvaging old concrete pavement in Gloversville, N. Y., by utilizing it as a base for a new asphalt surface.



Franklin Street, from Tupper Street to Allen Street, Buffalo, N. Y. Sheet asphalt surface on an asphaltic concrete or "black" base. The maintenance cost of this street has for sixteen years averaged only 0.012 per square yard per year.

The Asphalt Institute presents as a sound street construction program for 1931 the following basic considerations:

1. Surface treatment of outlying gravel and macadam streets to provide smooth, dustless surfaces and lower maintenance costs.
2. Utilization of the old brick, stone-block, cobble and concrete pavements on the more important streets as bases for asphalt surfaces, thus meeting modern traffic needs and saving the cost of new foundations.
3. Reconditioning of old asphalt streets by the heater method, requiring less than one inch of new pavement.
4. Utilization of "black" base for new construction, thus simplifying the problem of underground service cuts and pavement replacements.
5. Use of "non-skid" asphaltic surfaces on grades.

Many cities have reported successful results along these lines, their experience being set forth in a survey made by a committee of eminent engineers and now in course of publication by The Asphalt Institute. *Write for information.*

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A national institution not organized for profit but for constructive, educational and research activities. Representing 85% in volume of the asphalt producers in the United States and Canada.

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Visit the Asphalt Institute Booth No. A-125 at the Road Show.

Abutters' Rights

An interesting discussion of the rights of abutting owners on highways and streets, with citation of authorities, appears as an editorial in the *New York Law Journal* of October 7, 1930.

Garages in New York City

A survey of this subject is printed on the editorial page of the *New York Law Journal* for November 17, 1930.

Reflected Sunlight as a Nuisance

In *Shepler v. Kansas Milling Company* (278 Pac. 757-1929), the defendant Milling Company constructed a battery of grain tanks 60 feet high, separated from the plaintiff's residence by a public street and a railway right-of-way. These tanks were painted white, and the plaintiff sued for damages, alleging that the glare from them reflected upon his front porch was an actionable nuisance. The Court refused to grant relief. In criticising this decision more or less unfavorably, an editorial of October 4, 1930, discusses in an interesting manner various novel situations relating to the law of nuisance.

THE CITY'S LEGAL RIGHTS AND DUTIES

Conducted by A. L. H. STREET, Attorney at Law

Reinstatement of Policeman

Year's delay by policeman in suing to set aside removal barred reinstatement

A removed policeman was not entitled to a judicial review of the justness of his removal where proceeding for the review was not instituted until almost a year after the charges against him were heard and determined. (New Jersey Supreme Court, *O'Leary v. Common Council of City of South Amboy*, 151 Atl. 53.)

Discharge of Laborer

Civil service statute permitting municipal laborer to be discharged without charges held valid

Section 12 of the Illinois Civil Service Act permits discharge of municipal laborers without charges or hearing. This provision is not unconstitutional as depriving such laborers of property rights without due process of law nor as being discriminatory against them as a class. (Illinois Supreme Court, *People v. City of Chicago*, 168 N. E. 904.)

Dumping

Covering garbage with dirt violated statute limiting "dumping"

A statute forbidding the maintenance of municipal dumping-grounds within 300 yards of a public highway, was violated by the digging of trenches on land being filled for park purposes, placing garbage trash, etc., in the trench and covering it with dirt some hours later. The statutory prohibition against dumping "trash, refuse, débris, etc." within the distance limit also forbids the dumping of old iron, tin cans, etc.

A nearby property owner injuriously affected by the city's violation of the statute could enjoin further violation. (Texas Court of Civil Appeals, *Lambert v. City of Port Arthur*, 22 S. W. 2d, 320.)

Double Office-Holding

Becoming Port Development Commissioner disqualified incumbent as City Service Commissioner.

Membership on the City Service and Port Development Commissions of Baltimore was so far incompatible as to disqualify one from continuing membership on the first commission after accepting appointment to the second, decided the Maryland Court of Appeals in the case of *Lilly v. Jones*, 148 Atl. 434. Said the Court:

"It is the well-settled rule of the common law that a person cannot, at one and the same time, rightfully hold two offices which are incompatible, and thus when he accepts appointment to the second office, where this incompatibility exists, and qualifies, he vacates, or by implication resigns, the first office."

Liability—Fireworks

City held not liable for injury from unanticipated illegal explosion of fireworks bomb

A woman was injured by a fireworks bomb fired during a demonstration conducted by an association one Sunday night. Shooting the bomb without a permit was unlawful. Holding that defendant city was not liable, the Appellate Division of the New York Supreme Court said in the case of *Greiner v. City of Syracuse*, 41 N. Y. Supp. 313:

"Defendant did not create the nuisance and cannot be held liable for the injury caused, unless it had actual or constructive notice of a dangerous situation in time to have prevented the explosion."

Liability for Water Mains

Village held not bound to reimburse a development company for water mains, etc., laid by the company in territory afterwards annexed.

A real estate company, in developing a subdivision adjacent to a village, laid water mains, etc., to serve purchasers of lots; the water supply being furnished by the village. Later the subdivision was annexed to the village, and the company sued for reimbursement on account of the cost of laying the mains. Deciding that the village was not liable, the Ohio Court of Appeals for Hamilton County said, in part (*Suburban Real Estate Co. v. Incorporated Village of Silverton*, 167 N. E. 474):

"We are of opinion that, having sold the lots on the representation of furnishing water, and a means having been provided therefor, the Real Estate Company would not be heard to claim ownership in the water mains, with right to remove the same.

"Moreover, the village of Silverton could not contract for the purchase of such property, or construct such an improvement without specific legislation therefor. The village could only act through council, and council has only such powers as are conferred by statute and can only proceed under statutory authority.

"Annexation, upon application, is not legislation providing for the purchase or construction of an improvement. In the absence of statutory authority, no relief can be had against the village on the ground of conversion."

Liability for Police Negligence

City held not liable for negligence of policeman in leaving a pistol within reach of a dangerous man.

A policeman was summoned to quiet an intoxicated man who had beaten his wife and threatened further injury. A pistol that had been taken from the man was imprudently left by the policeman within his reach when the officer left. The disorderly fellow, going on a further rampage, seriously wounded a neighbor by shooting him with the pistol.

The Maryland Court of Appeals decided that the city was not liable for the injury, because the city was not responsible for the police officer's error in judgment, nor for failure of the Police Department to arrest the man when the police were first called. The neglect of the city, if any, occurred in the course of the discharge of governmental duty, within the exemption from liability for negligence in the exercise of governmental functions. (*Wynkoop v. Mayor and City Council of Hagerstown*, 150 Atl. 447.)

Benefit Assessments

School district held liable for special assessments for improvements and for electric energy for lighting system

The liability of a school district for special assessments for street and sewer improvements was recognized by the Montana Supreme Court in the case of *School District No. 1, Lewis and Clark County, v. City of Helena*, 287 Pac. 164. It was further held "that, in the absence of legislative declaration to the contrary, the assessments against the school property are liable for penalties and interest

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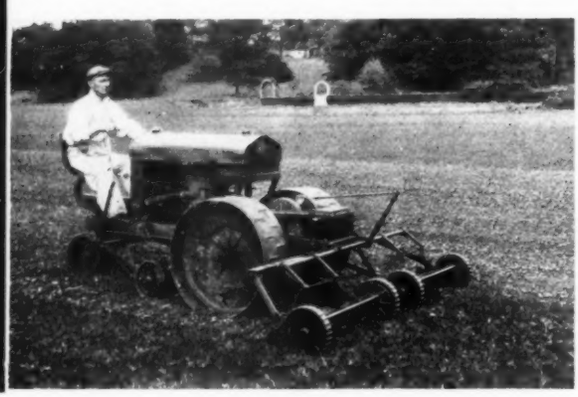
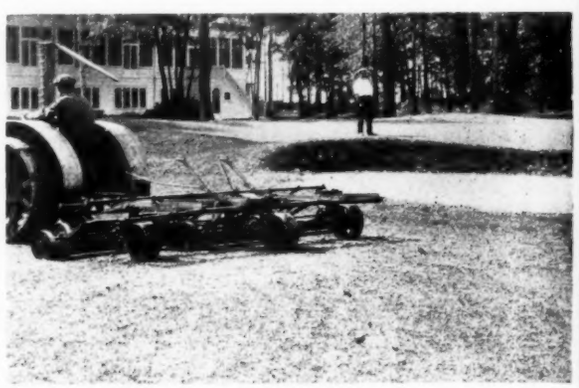
Wheel Type—two sizes, 20, 25-inch cut

Roller Type—two sizes—22, 30-inch cut



The Triplex



The Bulldog

Ideal builds four great new power mowers—gives them tremendous, smooth-flowing power for new handling ease and speed. Faster cutting gives smoother grass.
Finest mechanical details insure long, trouble-free life. Timken Bearing crankshaft. Foolproof lubrication system. Valve tappet mechanism resembles that of a fine car. Motor does not overheat.
Two wheel type models—20, and 25-inch cut. Two roller type models—22, and 30-inch cut. Roller type can climb even steep grades without trouble. Aluminum crankcase and frame gives unsurpassed lightness to wheel type models.

For larger, thickly foliaged jobs, there is no mower to equal the agile Triplex. It handles as high as 35 acres of foliaged ground per day—dodging trees and bushes with the agility of a human. Turns in its own length, backs up—cuts right to edge of walls—and when going to another park, it dons a pair of rubber tires and travels the highway under its own power.
For the big acreage, call in the Bulldog. This large-capacity mower is built on the low-wheeled principle—units are pushed forward and into the work. It means a better, smoother cutting job. Write for the details on the world's greatest line of grass cutting equipment.

IDEAL POWER LAWN MOWER COMPANY, 400 Kalamazoo St., Lansing, Mich.

FACTORY BRANCHES

413 W. Chicago Ave., Chicago, Ill.
237 Lafayette St., New York, N. Y.
161 Vester St. Ferndale (Detroit), Mich.
273 Boylston St., Brookline, Mass.

Canadian Distributors: Aikenhead Hardware, Ltd., 17 Temperance St., Toronto, Ont.

Dealers in all principal cities

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in case of delinquency, the same as the assessments against the property of any private owner."

It was also decided that the cost of electric energy necessary to maintain a lighting system is just as much assessable against the abutting property as the cost of the system itself. A decision of the Washington Supreme Court is cited as supporting the last-stated proposition.

Schools

Cities cannot be required to provide schooling for non-residents at an inadequate tuition fee

A statute purporting to require high school districts to admit non-residents living in districts having no high schools, is unconstitutional if it has the effect of requiring the high school districts to furnish such tuition at less than actual cost, decided the Texas Court of Civil Appeals in the case of *City of Dallas v. Love*, 23 S. W. 2d, 431. The Court said, in the course of an extended opinion:

"To sustain the provisions of the statute under consideration, and hold that school facilities and teaching service provided by the city of Dallas for resident scholastics shall be made available to high school students of other districts at less than actual costs of the service, and without reference to the adequacy of facilities provided for the accommodation of resident students, would, in our opinion, be to disregard the constitutional provisions hereinbefore mentioned. . . .

"We are of opinion, therefore, that the necessary effect of the objectionable provisions of the statute is to impose local tax burdens, and to deprive taxpayers of said districts of property without due process of law to furnish education to students of other districts. Therefore we hold that the statute, in so far as it attempts to coerce high school districts by forcing them without voice or hearing to furnish, at local expense, educational facilities and service to non-resident high school students at less than actual costs, is in contravention of the constitutional provision (section 1, art. 8) that guarantees equality and uniformity in taxation, and section 19, art. 1, that prohibits any citizen from being deprived of property except by due course of the law of the land."

Railway Speed

Cities may reasonably regulate the speed of railway trains

The validity of an ordinance of Stockton, Calif., limiting the speed of railway trains to eight miles per hour in passing through the city was sustained by the California District Court of Appeal in the case of *Switzler v. Atchison, Topeka & Santa Fe Railway Co.*, 285 Pac. 918. In ruling against an objection that such ordinances tend to interference with interstate commerce and the powers of state railroad commissions, the Court said that measures of this kind are a legitimate exercise of municipal police power to provide for the public safety. The opinion quoted and adopted the following language of the Ohio Supreme Court:

"An ordinance regulating the speed of trains through a municipality, enacted under the exercise of police power, which conforms to the limitations prescribed by the Legislature, is presumptively reasonable and valid, and not in conflict with the state or Federal Constitutions. But the presumption may be rebutted, and in order to overcome such presumption a railway company must affirmatively show its unreasonableness."

Special Legislation

Arterial traffic-way law held not invalid as special legislation because presently applicable to one city only

Kansas is one of the several states whose constitutions forbid special acts governing municipalities. An act of 1929 provided for the establishment and financing of arterial traffic ways in cities of more than 115,000 population situated in counties of less than $190,000,000 valuation. Only Kansas City, Kans., can presently qualify under this act. Wichita may soon come into the population class, but its valuation exceeds $200,000,000. Sustaining the validity of the act, against objection that it was special, the Kansas Supreme Court said in *State v. French*, 286 Pac. 204:

"While it [Kansas City, Kans.] is the only city to which it now applies, the act under consideration will apply to other cities as they become possessed of the requisite population and the counties in which they are situated meet the requirements as to valuation. It does not necessarily follow that it cannot apply to Wichita when that city attains a population of 115,000, because at the present time Sedgwick County has an assessed valuation of more than the maximum authorized by the statute. . . . Again, the fact that the act does not apply to a particular city which possesses one of the qualifications but not the other, does not render it unconstitutional. It is sufficient if the statute is general and operates uniformly upon all cities which meet its requirements and come within its classification. . . .

"The Legislature may well have had in mind that as to cities of 115,000 or more inhabitants, situated in counties having more than $190,000,000 valuation, it would in time, whenever the necessity arose, create still another classification. It may well have had in mind that as to the so-called arterial traffic ways in cities so situated, it would be advisable and proper to impose on the county at large a part of the burden of improving such traffic ways. The conditions with reference to the classification which it desired to make were solely matters for legislative determination."

Grade-Crossing Elimination

Railroad companies held liable to property owner for damage to abutting property through construction of a viaduct, although city contributed to cost

To eliminate a grade crossing in Birmingham, Ala., a viaduct was constructed over the tracks of several railroad companies. The city paid 35 per cent of the cost and supervised the work, while the railroad companies let the contract and paid the balance of the cost. A property owner sued the companies for damage to the property on account of the change in the grade. The companies failed in an attempt to avoid liability on the ground that the city alone was liable. The United States Circuit Court of Appeals, Fifth Circuit, said (*Southern Railway Co. v. Perfection Laundry Co.*, 38 Fed. 2d. 74):

"Decisions which hold that a municipality alone is liable for the acts of its contractors or agents in changing the grade of a street for purposes of its own are inapplicable to the facts of this case. The relation that existed between the city of Birmingham and appellants [the railroads] was not that of owner and contractor or of principal and agent. . . . Appellants contributed nearly twice as much as did the city toward the cost of the viaduct, and placed a limitation upon the use of it. Nor was the viaduct built merely for the purpose of enabling the city to change the grade of the street, but the necessity for it arose principally because of the existence of the railroad tracks. In jurisdictions where liability exists for changing the grade of streets, a railroad company and a municipal corporation which join in the construction of a viaduct for the purpose of eliminating a grade crossing for the benefit of both, are jointly and severally liable for the damage done to abutting property."

One-Man Street Cars

Ordinance requiring two-man street cars held void as being unreasonable

An injunction against enforcement of an ordinance requiring two men on each street car and the cars to be equipped with exits at both ends, was held by the United States Circuit Court of Appeals, Fifth Circuit, to be proper in the case of *City of Shreveport v. Shreveport Railway Co.*, 38 Fed. 2d, 945.

Referring to a decision announced by the highest court of the land in 1917, sustaining the validity of such an ordinance, the Court observes:

"It is evident that the above-cited case was not intended to go further than to hold that the ordinance was valid as applied to conditions existing at the time the suit was filed in 1917. There is no doubt that an ordinance, reasonable as applied to conditions existing at the time of its adoption, may become unreasonable by a change in conditions, and a city may not impose unnecessary restrictions upon lawful occupations under the guise of protecting the public interest. . . .

"As to the change in conditions, it is shown that one-man cars were still in the experimental stage in 1907, still so in 1917, and were in use in only a few cities. Today they are in operation in 103 of 106 cities in the United States having a population larger than Shreveport. The master found that the one-man street car has been greatly improved, that automatic safety devices have been invented, and that in safety of operation it can be compared to an automobile or bus in its adaptability to one-man control."

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SIX
Driver Hits Local Sedan, Hurries Off
A Paige sedan owned by J. M. Marshall, 218 North Division street, and driven by his daughter, Miss Jeanette Marshall, was struck and damaged on Strongs avenue at
FARMERS HELD IN PROBE OF ROAD DEATHS
Third Man Says He Was In Truck That Hit Boy

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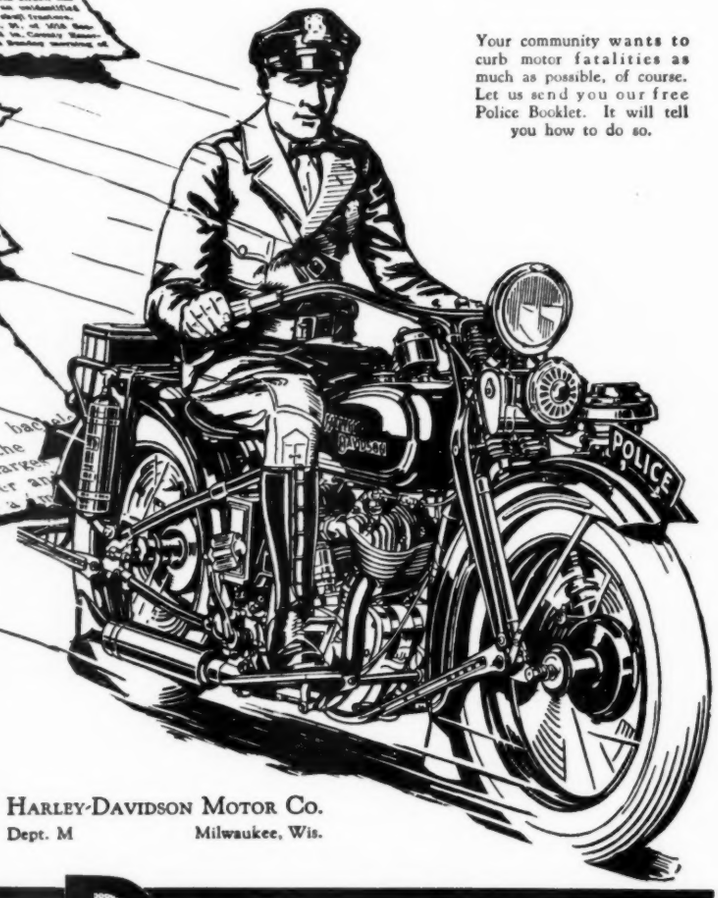
Your community wants to curb motor fatalities as much as possible, of course. Let us send you our free Police Booklet. It will tell you how to do so.



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Join the nation-wide campaign to check the wave of deaths-by-motor-violence. Adequate patrolling — by motorcycle police — has proved the most effective protection. See your local Harley-Davidson Dealer — or write us direct.

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MUNICIPAL AND CIVIC PUBLICATIONS

Prices quoted do not include postage, unless so stated.

Zoning

The Law of Zoning. By James Metzenbaum of the Cleveland Bar. Baker, Voorhis and Company, New York. 1930. 569 pp.

This volume does not pretend to be a thoroughgoing textbook giving and discussing all of the court cases and analyzing the present attitude of courts on zoning problems. It is rather a story of the development of building zones. Especial attention is given to the intimate history of the Euclid Village, Ohio, case, in which the author was the attorney for the village. Undoubtedly the entire country is under deep obligation to Ohio for the fortunate outcome of this case in the United States Supreme Court, for not only did the author do his full part, but Alfred Bettman, of Cincinnati, helped mightily as *amicus curiae*.

City attorneys may not feel that this book carries them down to bedrock on the zoning questions that are perplexing them. The author disclaims this as his purpose. The searcher for quick aid from court cases will, however, find a starting point in the good index, and the headings (with citations), such as illegal acts of boards of appeal, exhausting one's remedy before such a board, the power to vary, statutory rules of guidance limiting the powers of the board, determinations of the board on conditions, consent of neighboring property owners, vote of more than a majority of council, private restrictions, race segregation, and non-conforming uses. The author devotes 150 pages to copies of ordinances and procedural material. He undoubtedly intends this as illustrative only. It would be a mistake for any municipality to follow any of it blindly as a form.

EDWARD M. BASSETT.

Auditoriums

Alvin Gillett, Secretary, Association of Commerce, Madison, Wis., has prepared a report based upon research and direct questionnaires, on the public auditoriums of the country. Although entitled "The Municipal Auditorium," the study is largely concerned with the auditorium as a convention hall. The value of large conventions as revenue bringers is illustrated through use of statistical data; and their additional importance as a community publicity medium is discussed. 14 pp., multigraphed. (Apply to the author.)

Unemployment

"Community Planning in Unemployment Emergencies" is the title of a report which has just been prepared for the Russell Sage Foundation by Joanna C. Colcord in "an endeavor to bring together the recommendations for community action to meet emergent unemployment which have been put forth from time to time as the result of experience by social agencies and their representatives." Suggested programs for both emergency and permanent committees on unemployment are outlined. (See the article on p. 160.) Single copies are available for free distribution to those who can put them to good use. For lots of 25 and under 100, a charge is made of 25c per copy; over 100, 18c per copy. (Apply to the Foundation, 130 E. 22d St., New York.).

Unemployment Relief

The December issue of *Public Management*, which is published by the International City Managers' Association, contains two timely articles dealing with the city's relation to relief work: "The Administration of Municipal Relief Work," by Louis Brownlow, Municipal Consultant of the City Housing Corporation, New York City; and "Public and Private Relief Work in Council-Manager Cities." Mr. Brownlow discusses the effect of the emergency unemployment situation on the administration of the municipality. The other article summarizes the replies to a questionnaire sent to 400 city managers, of whom 166, 41.5 per cent, replied. Single copies of *Public Management* are 50c. (Apply to *Public Management*, 923 E. 60th St., Chicago, Ill.)

A. S. T. M. Tentative Standards

This 1930 annual publication of the American Society for Testing Materials contains 864 pages and presents 155 tentative standards, i.e., proposed standards that are published for the sake of criticism before being acted upon by the Society. These are included in the following groups: ferrous metals, 12; non-ferrous metals, 13; cement, lime, gypsum and clay products, 16; preservative coatings and petroleum products, 40; road and paving materials, 25; rubber products, insulating materials and textile materials, 24; coal and coke, shipping containers, slate and miscellaneous, 25. Tentative revisions in 35 existing A.S.T.M. standards are also given. $7, paper; $8, cloth. (Apply to the Society, 1315 Spruce Street, Philadelphia, Pa.)

Industrial Surveys

The Division of Municipal and Industrial Research of Massachusetts Institute of Technology has issued "A Report of Progress—Purpose, Methods and Results of the Work of the Division." The Division was established "for the express purpose of assisting cities and towns to examine their assets and liabilities and plan intelligently for the future." Surveys of two states, New Hampshire and Vermont and the following cities have been completed: Providence, Pawtucket and Central Falls, R. I.; Norwood, Mass.; Bangor, Brewster, Maine; Baton Rouge, La., Somerville, Mass.; El Paso, Texas. 8 pp. (Apply to the Division of Municipal and Industrial Research, Massachusetts Institute of Technology, Cambridge, Mass.)

Parking

"The Better Use of the City Street, with Special Reference to Parking On and Off the Street," is the title of a 16-page pamphlet issued by the Planning Foundation of America (see THE AMERICAN CITY, December, 1930, p. 181). It it now offered in quantity at the special price of $8 per hundred. (Apply to the Planning Foundation of America, 130 E. 22d St., New York, or THE AMERICAN CITY).

Real Estate

Annals of Real Estate Practice, 1930.—National Association of Real Estate Boards, Chicago, Ill., 916 pp. in buckram. To non-members, $7.50. Apply to THE AMERICAN CITY.

As formerly, *The Annals* contains selected papers from the Association's annual convention and its mid-winter meeting, together with especially prepared articles designed to round out the contents. That the realty profession is working with a consciousness of city planning is evident, year by year, from material presented in *The Annals*. The present volume contains papers on "City Planning and Street Widening," by Mark Levy; "The Subdivision and the City Planner," by Jacob Crane; and "Can Blighted Areas Be Rehabilitated?" by Harland Bartholomew.

Federal and State Tax Systems

As an initial step in an ambitious program for the preparation of a "tax encyclopedia," a set of tabular charts of the Federal tax system and the state and local tax systems of 29 states, as well as the District of Columbia, has been printed and collected in this 11½x15-inch volume of 42 pages, by the Commerce Clearing House, Inc., Loose Leaf Service Division of the Corporation Trust Co., under the direction of the New York State Tax Commission. The volume has been copyrighted by the National Tax Foundation. Besides giving in condensed tables the tax systems of the various governmental bodies referred to, as of January 1, 1930, there are other tables on "Status of Certain Tax Matters in the Various States" on the same date, including tax commissions, general property tax, motor vehicle license laws, public-utility and other corporation taxation, inheritance and income taxes, gasoline taxes, poll taxes, etc. (Apply to the New York State Tax Commission, Albany, N. Y.)

Regional Government

The Government of Metropolitan Areas in the United States.—National Municipal League, New York. 403 pp. $3.50.

This challenging volume is offered as the report of the National Municipal League's Committee on metropolitan government. It is largely the work of Dr. Paul Studenski, and an editorial subcommittee consisting of F. H. Sommer, H. W. Dodds and T. H. Reed. The Committee has attempted to survey the problems attendant upon the growth of independent suburban communities near to all large cities. It considers direct incorporation and the obstacles to this, the problems of city-county separation or consolidation, the development of independent municipal authorities and various efforts at decentralization and federation. There are also highly suggestive chapters on inter-municipal agreements and the differentials in tax burdens in urban and suburban communities. The whole is logically arranged, carefully documented and intelligently indexed. It is a real contribution to the problems of urban concentration. (See article on Metropolitan Regions, p. 144.)

JOSEPH MCGOLDRICK.

Roadsides

No one questions that something is wrong with the roadsides of the country; that they are suffering from a complication of ills. But "it is impossible to suggest remedies for the various diseases without first determining their character and extent." An effective method of making diagnoses has been found by The American Nature Association and the National Council for Protection of Roadside Beauty in state-wide roadside surveys. The result of such a survey, "The Roadsides of Oregon," has just been published (with recommendations) in an attractively illustrated booklet of 36 pages, with a foreword by the Governor, Hon. A. W. Norblad. This is uniform with "The Roadsides of North Carolina," a report of the study in the first state to invoke the new procedure. (See THE AMERICAN CITY, June, 1930, p. 185). Surveys have been made in several other states, and interest aroused indicates that similar state-wide studies will be continuously carried on. (Apply to The American Nature Association, Washington, D. C.)

City Plan Progress

The Annual Report, Department of City Planning, Los Angeles, Calif., July, 1929-June, 1930, is somewhat more than an assemblage of facts and figures accounting for actual official activities during that period. The tenth year of the existence of city planning in Los Angeles and the fifth year of existence of the Department of City Planning under the City Charter ended simultaneously. Therefore, the 76-page large quarto volume comprises a general summary of the ten-year period, and contains a series of articles by members of the Commission and its staff, making a remarkably interesting and significant volume. (Apply to Board of City Planning Commissioners, Los Angeles, Calif.)

Annexation

An outline of procedure—with forms—for the annexation of territory by cities in the state of Wisconsin, has been prepared by Frederick N. MacMillen, Executive Secretary, League of Wisconsin Municipalities. It is available in 20-page multigraphed form, under the title "The Annexation of Territory by Cities." (Apply to the League, Madison, Wis.)

Roadside Development

Fifty multigraphed pages are required for the "Partial List of References to Roadside Development" compiled by Mildred Wilson and issued by the United States Bureau of Public Roads. Billboards, Comfort Stations, Roadside Stands, Roadside Planting, Highway Sidewalks, Drinking Water, and Weeds, are divisions under which the material is presented, following a general section. (Apply to the United States Bureau of Public Roads.)

POWER
ECONOMY
PERFORMANCE!

An Allis-Chalmers "75" with heavy duty grader and a "50" with rotary scraper, on a road job in Minnesota.

Visit our display at the Road Show in St. Louis, Jan. 12 to 16, 1931.

Men who have driven *all* makes of tractors write letters about the "Allis-Chalmers Track-Type" in which they say . . . . *"the finest piece of machinery I ever took care of"* . . . . *"more power than in any tractor of its size"* . . . . *"easiest handling and steering and doesn't tire you out after a long day's work."*

Write for descriptive literature and the name of your nearest Allis-Chalmers dealer.

Monarch '35', '50' and '75' Track-type tractors, Model 'U' Wheel-type tractors.

ALLIS-CHALMERS MANUFACTURING COMPANY

Industrial Tractor Division, Springfield, Ill. *Specialists in Power Machinery Since 1846* General Offices, Milwaukee, Wis.

Allis Chalmers

TRACTOR POWER FOR EVERY PURPOSE

Asphalt Products for Repairing

A special committee on street pavement of the New Rochelle, N. Y., Chamber of Commerce has just completed a study of types of pavement with a view to making recommendations to the city government with regard to the best material for a certain repaving job. The report, which was approved by the Board of Directors of the Chamber, is entitled "Recommendations as concerns the Proposed New North Avenue Pavement Between Huguenot Street and Eastchester Road," and favors "any of the standard asphalt products providing it is carefully laid under skilled supervision and workmanship, including proper rolling." 2 pp. (Apply to Ralph Morrow, Secretary-Manager, New Rochelle Chamber of Commerce, Inc., New Rochelle, N. Y.)

Asphalt Paving

The Proceedings of the Technical Session of the Association of Asphalt Paving Technologists, held at West Baden, Ind., October 30, 1929, appeared recently in the form of a 72-page booklet, containing a report on the deterioration of asphalt pavements, and papers on the history, development, types and characteristics of asphalt paving emulsions, and their use for penetration pavements; hot-laid and cold-laid asphalt paving mixtures; the Colprovia paving method; the Asfalterra method for oiled earth roads; rock-asphalt and pavements, etc. An article on a 10-ton laboratory roller, from the 1928 Proceedings, is reprinted, with illustrations added. A list of members is also given. (Apply to Charles A. Mullen, Secretary-Treasurer, 980 Saint Antoine Street, Montreal, Que.)

A Water and Light Report

This 135-page booklet contains, as stated on the title page, a "Resume of Data Relative to the Financial Expansion and Physical Growth of a Municipal Utility," and is by J. A. Laack, President, Plymouth Water and Light Commission. Municipal ownership of the water and light utility began in 1901, with purchase of the privately owned system, the development of which is traced, as well as the growth under municipal auspices. A very complete account is given, documented by copies of various ordinances, proposals, rate schedules, legal briefs, findings of the Wisconsin Railroad Commission, balance sheets, income statements, etc. The steps leading to the present arrangement for purchased power, with the city's power-plant retained for standby service, are specially gone into. The booklet represents commendable enterprise in placing the history and status of the utility before the citizens. (Apply to the Commission.)

A Health Survey

Public Health Organization in the Chicago Region. By Robert F. Steadman. University of Chicago Press. 279 pp. $3.00.

Here is a survey of the manner in which 101 independent governmental agencies are meeting the public health problems of the five million people of the Chicago Region. After an opening chapter on these governmental agencies, the approach is distinctly functional, with chapters on such topics as vital statistics, contagion, tuberculosis, venereal diseases, maternity and child hygiene. There are also chapters on milk supply, food, water and sewage. The author finds that the city of Chicago's health protection is superior not only to that afforded in the rural communities, but to that of the better suburban cities as well, except in the matter of tuberculosis. He finds that while a few suburban units surpass the central city in special phases of health administration, only two or three equal or even approach the average level of Chicago's health program.

Pacific Coast Population Figures

In a 32-page pamphlet, "The Population Census of 1930," the Los Angeles Chamber of Commerce publishes the preliminary 1930 census figures of all cities, towns and communities in California, as well as the 1920 figures. The 1930 figures for population by counties are also given for the eleven states which form the Western Trade Area. (Apply to A. G. Arnoll, Secretary and General Manager, Los Angeles Chamber of Commerce, Los Angeles, Calif.)

Sewage Treatment

The New Jersey Sewage Works Association has issued the Proceedings of its 15th Annual Meeting, held at Trenton in March, 1930. It contains papers on sewage treatment plants at Red Bank and Glassboro, organic solids in filters, glass-covered sprinkling filters and sludge-drying beds, control of mosquito breeding in catch-basins, cesspools and disposal plants, detention periods in settling tanks, deodorization of sludge, thermophilic digestions, various other operating problems, and the Rutgers University and Camden County short courses (in sewage plant operation and water analysis, respectively). 79 pp., illustrated. (Apply to John R. Downes, Secretary of the Association, Bound Brook, N. J.)

Paving Research

Under the title, "Asphalt Paving Mixtures—Application of Research to Design," the Asphalt Institute publishes a pamphlet containing three papers, on principles of design, stability and related tests, and application of test results, respectively, by Prevost Hubbard, Chemical Engineer for the Institute, with F. C. Field, Chemist for the Institute, collaborating on the second. The first paper was presented before the Engineers' Club of Philadelphia. 19 pp.; illustrated. (Apply to the Institute, Crystal Bldg., 13d St. and Second Ave., New York).

Housing and Planning

All publications of the Bureau of Standards relating to Building Materials, Home Building, Home Ownership, City Planning and Zoning, are catalogued and the terms of their availability given, in a 58-page mimeographed bulletin compiled by the Division of Building and Housing of the Bureau and published under date of November 30, 1930, as Circular Letter LC-290. (Apply to the Division of Building and Housing, Bureau of Standards, Department of Commerce, Washington, D. C.)

Industrial Diversification

In an article, "Industrial Diversification in American Cities," reprinted from *The Quarterly Journal of Economics* for November, Glenn E. McLaughlin, of the University of Pittsburgh, summarizes the results of a study made to discover whether any significant relations exist between the degree of industrial concentration in a given city and the business fluctuations which that city experiences. Statistics were analyzed for fourteen of the leading American industrial cities together with two highly specialized steel cities, Birmingham and Youngstown. A significant degree of correspondence between concentration and the severity of seasonal variation was found in the case of several cities. 17 pp. (Apply to author, University of Pittsburgh, Pittsburgh, Pa.)

Memorial Trees

The 200th anniversary of the birth of George Washington will be observed in 1932 by nation-wide tree planting programs sponsored by the American Tree Association and the George Washington Bi-Centennial Commission jointly. Forms of planting advocated, general planting instructions, instructions to planting committees, suggestions for the tree planting program, and other descriptive and explanatory details are included in a 20-page pamphlet, "George Washington Bi-Centennial Tree Planting." (Apply to American Tree Association, 1214 16th Street, Washington, D. C.)

Stream Pollution

A report entitled "Methods for Abatement of the Pollution of the Raritan River" was made in 1930 to the Port Raritan District Commission by Remington, Vosbury & Goff, engineers, Camden, N. J., associated with whom were Harry N. Lendall and Dr. Willem Rudolfs. It is printed as a brochure of 83 pages and 22 plates, well illustrated. It describes the pollution problem of the river, which drains the central part of New Jersey; compares the abatement methods of a trunk sewer and of separate sewage treatment plants; and recommends a comprehensive plan for the restoration of the river to a sanitary condition, and for the collection and treatment of sewage. (Apply to the engineers).

Ordinances

Under the title, "What Our City Councils Are Doing," the Municipal Reference Library of Chicago publishes from time to time a brief list of references to new ordinances introduced or passed by city councils of large cities. List No. 22, dated December 12, 1930, has 4 closely mimeographed pages and contains subjects ranging from "Amusements" to "Taxicabs." (Apply to Frederick Rex, Librarian, City Hall, Chicago, Ill., with 2 cents for mailing).

Water Works

The Appleton (Wis.) Water Commission has prepared a compact history and description of the water works of that city, under the title, "A Brief Historical Sketch and Interesting Data Concerning the Appleton Water Works." Water is taken from the Fox River and aerated, purified and clarified. Financial statements for 1929 are included. 23 pp.; illustrated. (Apply to the Commission).

County Statistics

The useful "Comparative Statistics, Counties of Ohio," issued annually by the Auditor of State, is available for the year 1929, as an 82-page booklet, divided into Revenues, Expenditures, Debt and Reference, with various subdivisions under each of these heads. (Apply to Joseph D. Tracy, Auditor of State, Columbus, Ohio).

Supervision of Local Finance

In Publication No. 30 of the League of Minnesota Municipalities, reprinted from Volume XV of *Minnesota Municipalities*, Edwin O. Stene, of the Department of Political Science at the University of Minnesota, reports on "State Supervision of Local Finance in Minnesota." There are chapters on State Control of Local Taxation, Relation of the State to Municipal Budgeting, Supervision of Municipal Accounting and Supervision of Municipal Indebtedness. 34 pp. 50c. (Apply to the League, 16 University Library, Minneapolis, Minn.)

Sewage Treatment

An article entitled "Description of the DeKalb Sanitary District Sanitary Sewage System and Sewage Treatment Plant," by A. A. Brensley, Sanitary Engineer, Suhr, Berryman, Peterson and Suhr, Chicago, appeared in the 1929-1930 Proceedings of the Illinois Association of Sanitary Districts, and is reprinted by the Trustees of the DeKalb Sanitary District as an aid to visitors. 11 pp.; illustrated. (Apply to the author).

Gas Directory

Brown's Directory of American Gas Companies. 1930 Edition. Robbins Publishing Co. 1930. 685 pp. $15.00 from THE AMERICAN CITY.

This standard annual directory, which for the last ten years has been combined with a gas engineering and appliance catalog, is now in its 14th edition. The directory section continues to present much valuable detailed information concerning gas plants, whether privately or municipally owned, including physical and business statistics, rates and names of officers. The development of butane gas plants in the past year has prompted the publishers to include a separate section of these, of which there are 33, chiefly under one holding company. Municipal gas plants reported include 45 manufactured-gas plants and 11 using natural gas.

Other Reports Received

CHICAGO, ILL.—Annual Report of the Department of Public Works, year ending December 31, 1929. 370 pp.

MARYLAND.—Report of the State Roads Commission, 1927-1930. 270 pp.

ONTARIO, CANADA.—Annual Report of the Hydro-Electric Power Commission, year ended October 31, 1929. 458 pp.

SAN FRANCISCO, CALIF.—Annual Report of the Bureau of Engineering of the Department of Public Works, City and County of San Francisco, fiscal year ended June 30, 1930. 113 pp.

ST. PAUL, MINN.—Annual Report of the Commissioner of Public Works, year ending December 31, 1929. 83 pp.

HIGHWAY DEPARTMENTS

have problems of their own in handling road materials in their yards and asphalt plants.

The NELSON Q-7 LOADER

has successfully overcome many of these difficulties for contractors and road builders.

Its low initial cost keeps down overhead.

Its rugged strength and digging power not only cut down repair bills but also insure its freedom from breakdown as well as its readiness whenever needed.

Look it over at the Road Show.

The N. P. NELSON IRON WORKS, Inc.

822 Bloomfield Avenue **Passaic, N. J.**

it does not pay to shovel by hand when one Nelson

does the work of dozens of men

CONVENTIONS—WHEN AND WHERE

(Figures in parentheses following the name of the convention city indicate the estimated attendance, other than local.)

JANUARY 5-7.—WILKES-BARRE, PA. (75)
Pennsylvania State Association of Township Commissioners. Annual convention. Secretary-Treasurer, M. B. Black, Annville, Pa.

JANUARY 12-16.—ST. LOUIS, MO. (25,000)
American Road Builders' Association. Annual meeting. (Distributors' Day, January 10.) Secretary-Director, Charles M. Upham, National Press Building, Washington, D. C.

JANUARY 13.—NEW YORK.
Society of Terminal Engineers. Annual meeting. Secretary-Treasurer, Charles H. Newman, 30 Broad Street, New York.

JANUARY 15-17.—WASHINGTON, D. C.
American Engineering Council. Annual meeting. Executive-Secretary, L. W. Wallace, 26 Jackson Place, Washington, D. C.

JANUARY 15.—BOISE, IDAHO. (100)
Idaho State Chamber of Commerce. Annual meeting. Secretary, L. F. Parsons, 529 Idaho Building, Boise, Idaho.

JANUARY 19-21.—NEW YORK. (100)
American Society of Landscape Architects, Inc. Annual meeting. Executive Secretary, Bradford Williams, 9 Park Street, Boston, Mass.

JANUARY 19-23.—LAFAYETTE, IND. (500)
Purdue Road School. Annual. Address: Professor Ben H. Petty, Engineering Extension Department, Purdue University, Lafayette, Ind.

JANUARY 19-23.—DETROIT, MICH.
Society of Automotive Engineers. Annual meeting. Secretary, John A. C. Warner, 29 West 39th Street, New York.

JANUARY 20.—NEW YORK.
Institute of Traffic Engineers. Quarterly meeting. Secretary-Treasurer, Hawley S. Simpson, 175 Fifth Avenue, New York.

JANUARY 20-23—WACO, TEXAS. (300)
Texas Water Works Short School. Annual session. Address: V. M. Ehlers, Secretary of the Southwest Water Works Association—Texas Section, Austin, Texas.

JANUARY 21-23.—NEW YORK. (1,000)
American Society of Civil Engineers. Annual meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

JANUARY 22.—NEW YORK. (75)
American Society of Civil Engineers—City Planning Division. Annual meeting. Secretary, Harold M. Lewis, 130 East 22nd Street, New York.

JANUARY 22-23.—TOPEKA, KANS. (100)
Kansas Engineering Society. Annual meeting. Secretary, J. M. Averill, Route 7, Topeka, Kans.

JANUARY 23-24.—NEW YORK. (100)
American Social Hygiene Association. Annual meeting. General Director, Dr. William F. Snow, 370 Seventh Avenue, New York.

JANUARY 25-28.—SAN FRANCISCO, CALIF. (400)
Associated General Contractors of America. Annual convention. Managing Director, E. J. Harding, 1150 Munsey Building, Washington, D. C.

JANUARY 26-29.—LOUISVILLE, KY. (350)
National School Supply Association. Annual convention. Executive Secretary, J. W. McClinton, 176 West Adams Street, Chicago, Ill.

JANUARY 27-31.—NEW YORK.
American Institute of Electrical Engineers. Annual winter convention. National Secretary, F. L. Hutchinson, 33 West 39th St., New York.

JANUARY 27-29.—PITTSBURGH, PA.
American Society of Heating and Ventilating Engineers. Annual meeting. Secretary, A. V. Hutchinson, 51 Madison Avenue, New York.

JANUARY 28-30.—ROCKFORD, ILL. (200)
Illinois Society of Engineers. Annual meeting. Secretary-Treasurer, Winfred D. Gerber, 1001 West Oregon Street, Urbana, Ill.

JANUARY 28.—HARRISBURG, PA.
Pennsylvania State Chamber of Commerce. Annual meeting. General Secretary, George E. Foss, Harrisburg, Pa.

FEBRUARY 4-6.—MONTREAL, QUE.
Engineering Institute of Canada. Annual meeting. Secretary, R. J. Durley, 2050 Mansfield Street, Montreal, Que.

FEBRUARY 4-6.—PITTSBURGH, PA.
National Paving Brick Manufacturers Association. Annual meeting. Managing Director, G. F. Schlesinger, 1245 National Press Building, Washington, D. C.

FEBRUARY 5-7.—NASHVILLE, TENN. (125)
American Water Works Association—Kentucky-Tennessee Section. Annual meeting. Executive Secretary, F. C. Dugan, 532 West Main Street, Louisville, Ky.

FEBRUARY 5.—DANVILLE, VA.
Virginia State Chamber of Commerce. Annual meeting. Managing Director, LeRoy Hodges, 708 Grace-American Building, Richmond, Va.

FEBRUARY 11-13.—LAWRENCE, KANS. (400)
Kansas Water Works Association. Annual meeting. Secretary-Treasurer, E. A. Boyce, State Board of Health, Lawrence, Kans.

FEBRUARY 12-14.—MINNEAPOLIS, MINN. (50)
Minnesota Association of Commercial Secretaries. Annual meeting. Secretary, P. H. Unumb, Chamber of Commerce, Alexandria, Minn.

FEBRUARY 17.—NEW HAVEN, CONN. (100)
Connecticut Society of Civil Engineers. Annual meeting. Secretary, C. M. Blair, Box 235, New Haven, Conn.

FEBRUARY 18-20.—ATLANTIC CITY, N. J. (3,000)
Association of Highway Officials of North Atlantic States. Annual convention. Secretary-Treasurer, A. Lee Grover, Secretary of the State Highway Commission of New Jersey, Trenton.

FEBRUARY 18-20.—ANN ARBOR, MICH. (600)
Conference on Highway Engineering—University of Michigan. Annual convention. Secretary, R. E. Morrison, University of Michigan, Ann Arbor, Mich.

FEBRUARY 18-20.—ATLANTIC CITY, N. J. (110)
New Jersey Mosquito Extermination Association. Annual convention. Secretary, Dr. Thomas J. Headlee, State Experiment Station, New Brunswick, N. J.

FEBRUARY 21-26.—DETROIT, MICH. (10,000)
National Education Association—Department of Superintendence. Annual meeting. Executive Secretary, Sherwood D. Shankland, 1201 16th Street, N. W., Washington, D. C.

FEBRUARY 23-24.—CHICAGO, ILL. (75)
American Concrete Pipe Association. Annual convention. Secretary, M. W. Loving, 33 West Grand Avenue, Chicago, Ill.

FEBRUARY 24-26.—MILWAUKEE, WIS. (800)
American Concrete Institute. Annual convention. Secretary, Harvey Whipple, 2970 West Grand Boulevard, Detroit, Mich.

FEBRUARY 24-27.—WICHITA, KANS. (25,000)
Southwest Road Show and School. Manager, F. G. Wieland, Exposition Building, Water and Williams Streets, Wichita, Kans.

FEBRUARY 25-27.—TORONTO, ONT. (500)
Ontario Good Roads Association. Annual convention. Secretary, S. L. Squire, 98 Albany Avenue, Toronto, Ont.

MARCH 2.—HURON, S. DAK.
South Dakota Commercial Secretaries' Association. Annual convention. Secretary, G. R. McArthur, Huron, S. Dak.

MARCH 4-6.—PRINCE ALBERT, SASK. (1,100)
Saskatchewan Association of Rural Municipalities. Annual convention. Secretary, J. J. McGurran, Nokomis, Sask.

MARCH 11-13.—WINDSOR, ONT. (300)
American Water Works Association—Canadian Section. Annual meeting. Secretary-Treasurer, A. U. Sanderson, Department of Public Works, City Hall, Toronto, Ont.

MARCH 12.—CHICAGO, ILL. (100)
Midwest Safety Conference. Annual. Manager, George C. Traver, Chicago Safety Council, 330 South Wells Street, Chicago, Ill.

MARCH 12.—CONCORD, N. H. (150)
New Hampshire Good Roads Association. Annual meeting. Secretary, Frank D. Sleeper, Laconia, N. H.

APRIL 7-9.—COLUMBIA, S. C. (250)
American Water Works Association—Southeastern Section. Annual meeting. Secretary-Treasurer, W. H. Weir, 4 Capitol Square, S. W., Atlanta, Ga.

APRIL 9-10.—ANACONDA, MONT.
American Water Works Association—Montana Section. Annual meeting. Secretary, Herbert B. Foote, State Sanitary Engineer, Helena, Mont.

APRIL 12-27.—MILANO, ITALY.
International Exhibition for the Safety of Highway Traffic. Address: The Royal Automobile Club of Italy, Corso Venezia, 69, Milano, Italy.

APRIL 16.—NORFOLK, VA.
American Society of Civil Engineers. Annual spring meeting. Secretary, George T. Seabury, 33 West 39th Street, New York.

APRIL 17.—PITTSBURGH, PA.
Safety Engineering Conference. Annual conference. Secretary, George E. Clarkson, Manager of the Western Pennsylvania Safety Council, 2409 First National Bank Building, Pittsburgh, Pa.

APRIL 20-23.—BIRMINGHAM, ALA.
American Society of Mechanical Engineers. Semi-annual meeting. Secretary, Calvin W. Rice, 29 West 39th Street, New York.

APRIL 20-23.—TORONTO, ONT.
Building Officials' Conference. Annual meeting. Secretary-Treasurer, Col. John W. Ochmann, Inspector of Buildings, District Building, Washington, D. C.

APRIL 20-21.—MARLIN, TEXAS. (5,000)
East Texas Chamber of Commerce. Convention. Secretary, Hubert M. Harrison, Longview, Texas.

APRIL 20-26.—MILANO, ITALY.
International Congress of Sanitary Engineering and Municipal Hygiene. General Secretary, Charles Rauch, Engineer, Piazza Del Duomo N. 17, Milano, Italy.

APRIL 23-24.—ROANOKE, VA. (125)
Southern Commercial Secretaries' Association. Annual meeting. Secretary-Treasurer, Karl Lehman, Orange County Chamber of Commerce, Orlando, Fla.

APRIL 29-MAY 1.—ATLANTIC CITY, N. J. (3,000)
Chamber of Commerce of the United States of America. Annual meeting. Secretary, A. D. Skinner, 1615 H Street, N. W., Washington, D. C.

APRIL 29-30.—BOSTON, MASS.
Massachusetts Safety Conference. Secretary, Lewis E. MacBrayne, 6 Beacon Street, Boston.

MAY 4-9.—WASHINGTON, D. C. (2,000)
International Chamber of Commerce. Biennial congress. Manager of the American Section, John P. Gregg, Connecticut Avenue and H. Street, N. W., Washington, D. C.

MAY 25-29.—PITTSBURGH, PA. (1,000)
American Water Works Association. Annual convention. Secretary, Beekman C. Little, 29 West 39th Street, New York.

JUNE 1-5.—BERLIN, GERMANY. (1,000)
International Federation for Housing and Town Planning. Joint meeting with the International Housing Association. Organizing Secretary, H. Chapman, 25 Bedford Row, London, W. C. I., England.

JUNE 1-5.—BERLIN, GERMANY. (1,000)
International Housing Association. General Secretary, Dr. Hans Kampffmeyer, Hansa Allee 27, Frankfurt am Main, Germany.

JUNE 3-5.—ASHEVILLE, N. C. (250)
American Forestry Association. Annual meeting. Executive Secretary, Ovid M. Butler, 1523 L Street, N. W., Washington, D. C.

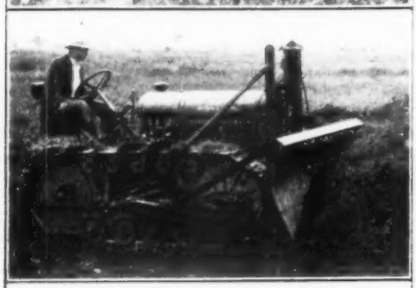
JUNE 8-11.—TORONTO, ONT.
National Association of Purchasing Agents. Annual convention and Informashow. Secretary-Treasurer, G. A. Renard, 11 Park Pl., New York.

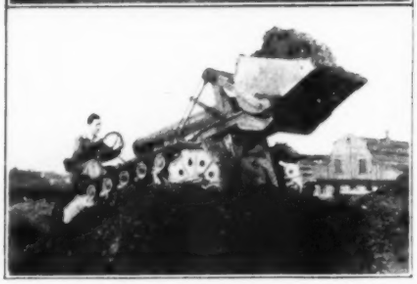
JUNE 21-22.—WISCONSIN RAPIDS, WIS.
Wisconsin Association of Commercial Secretaries. Annual meeting. Secretary-Treasurer, Lee I. Yorkson, Wausau, Wis.

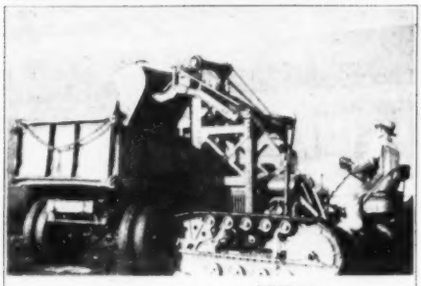
JUNE 22-23.—LAKE WORTH, FLA. (30)
Florida Commercial Secretaries' Association. Annual convention. Secretary-Treasurer, George F. Sampson, Winter Haven, Fla.

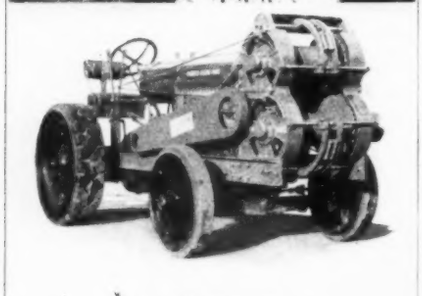
JUNE 27-JULY 4.—LOS ANGELES, CALIF. (10,000)
National Education Association of the United States. Annual meeting. Secretary, J. W. Crabtree, 1201 16th Street, N. W., Washington, D. C.

POWER FOR PROFIT









LOWER COSTS in road building and contracting during the new year are going to require something more than the usual good equipment. Equipment will have to be not only good but widely adaptable — suited to the greatest number of different jobs. After a machine, let us say a bulldozer, has done its usual work, it will have to drop that attachment and keep on going with some other.

■ That will be an easy matter for such Trackson Equipment as bulldozers, shovels, trench rollers, etc., for each uses the same hoisting assembly and is therefore interchangeable with the other. On many operations one Trackson Crawler Tractor with two or more of these attachments is essentially the equal of the same number of complete units. The short time required for change-over is negligible compared to the saving effected thru lower investment, less depreciation and the continuous use of one machine.

■ All Trackson Equipment has been designed with this utility end in view. The crawlers have been designed to provide plenty of room for the easy and secure attachment of equipment. No matter which attachment is used the drawbar is always available for duty. Let us suggest the combination of equipment that will bring you lowest costs. Trackson Company, 1322 So. First St., Milwaukee, Wis.

ROAD SHOW BOOTH A-27

TRACKSON
TRACTOR EQUIPMENT

NEWS AND ILLUSTRATIONS

Items of Interest to City, Town and County Officials, and Others Concerned with the Economical Construction and Efficient Operation of Public Improvement Undertakings

A New Rescue Squad Car for Jersey City

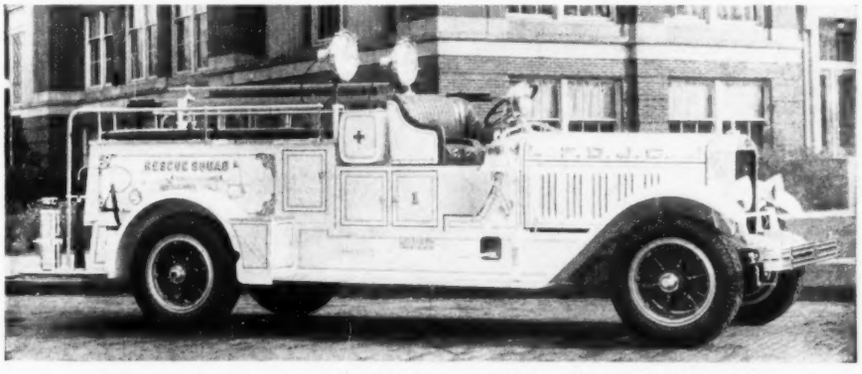
A new rescue squad car, constructed by the American-LaFrance and Foamite Corporation, of Elmira, N. Y., has recently been delivered for service in Jersey City, N. J. Besides containing compartments for carrying inhalators, gas masks, stretchers, first-aid kits and similar life-saving equipment, the machine carries a complete electrical generating set, 600 feet of insulated cable, and floodlights and portable searchlights. The generating set, consisting of a 3½-kilowatt generator, is mounted in a compartment behind the driver's seat, and is operated by the motor of the apparatus. The generator is complete in every detail, being supplied with panels, fuse blocks, volt-meter, etc.

The lighting equipment consists of two huge floodlights, each fitted with a 500-watt bulb, and mounted on pedestals near the front of the apparatus, one on each side. The lights may be raised or lowered and are equipped with swivels. When necessary, they may be quickly removed and attached to the 600-foot cable for portable use. In addition to the floodlights, drills, electric saws and similar tools may be attached to the cables, which are mounted on reels at the extreme rear of the apparatus. Plugs, installed in a panel near the driver's seat, make possible the use of additional lights and electric salvage and rescue apparatus.

The body of the unit is of the squad type with seats running lengthwise, and will accommodate ten men besides the driver and the other occupant of the front seat. Compartments which contain the first-aid and rescue equipment are fitted with individual doors, allowing speedy and ready access.

It is mounted on the American-LaFrance Metropolitan chassis, and motive power is furnished by a 140-horsepower engine. The entire machine is streamlined and specially painted in white with gold trimmings and blue shadings. In addition to the first-aid, salvage and operating and maintenance tools, the machine has two portable carbon dioxide extinguishers of 7½ and 15 pounds gas capacity and a carbon tetrachloride type Fire-Gun. These devices are especially suited for fighting electrical fires, and fires in highly inflammable liquids.

This unit was the result of the collaboration of Deputy Chief James J. Tully of the Jersey City Fire Department with the engineers of the American-LaFrance organization. The Jersey City officials have been thinking of the acquisition of such a unit for some time and Deputy Chief Tully has given considerable thought and time to the question of design.



JERSEY CITY'S NEW AMERICAN-LA FRANCE RESCUE SQUAD CAR

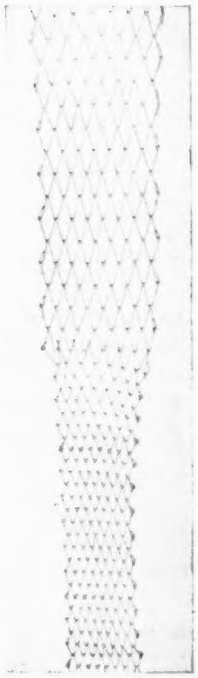
A New Chain-Link Road-Guard

A new style of heavy-duty road-guard made from full No. 4 gage copper bearing special quality steel wire, built upon scientific principles and woven in diamond mesh approximately 3 x 6 inches, has been put upon the market by the W. F. Robertson Steel & Iron Co., Cincinnati, Ohio.

This new road-guard weighs a little more per 100 feet than the 2-inch x No. 6 gage guard which is also made by this company, both guards being of sturdy, rugged construction designed to withstand severe shocks. They are easily spliced for repair purposes and are made in a standard width of 24 inches. They can be made wider, if desired.

This chain-link guard cushions the shock by stretching a little, forming one continuous safety ribbon, and is quickly erected and easily repaired. It offers protection for grade crossings, bridge approaches, culverts, embankments, curves, ditches, speedways and other dangerous places, saving lives and property. Enough 2-inch by No. 6 gage hot dipped galvanized staples for erection are furnished with each roll.

The accompanying illustration shows a piece of the new-style heavy-duty woven-wire chain-link road-guard spliced to a piece of the old-style guard. Both pieces were then simultaneously stretched in a machine. It can be readily seen how the old-style guard below pulled down into a narrow, practically worthless ribbon.



TEST OF NEW AND OLD STYLE ROAD GUARD

The State Highway Department of Illinois has purchased considerably over 100 miles of the new-style guard this year. On each order they have been given the choice of either kind of guard at the same price and have invariably chosen the new-style heavy-duty fence.

On both styles the ends of the pickets are cut off square. Sometimes when a fast-moving machine runs into the guard, by the excessive strain an occasional knuckle may open up, leaving the ends sticking out, in which case a square-cut point offers considerably less danger to the motorist than a sharp-cut point.

Welton in Pittsburgh for Gamewell

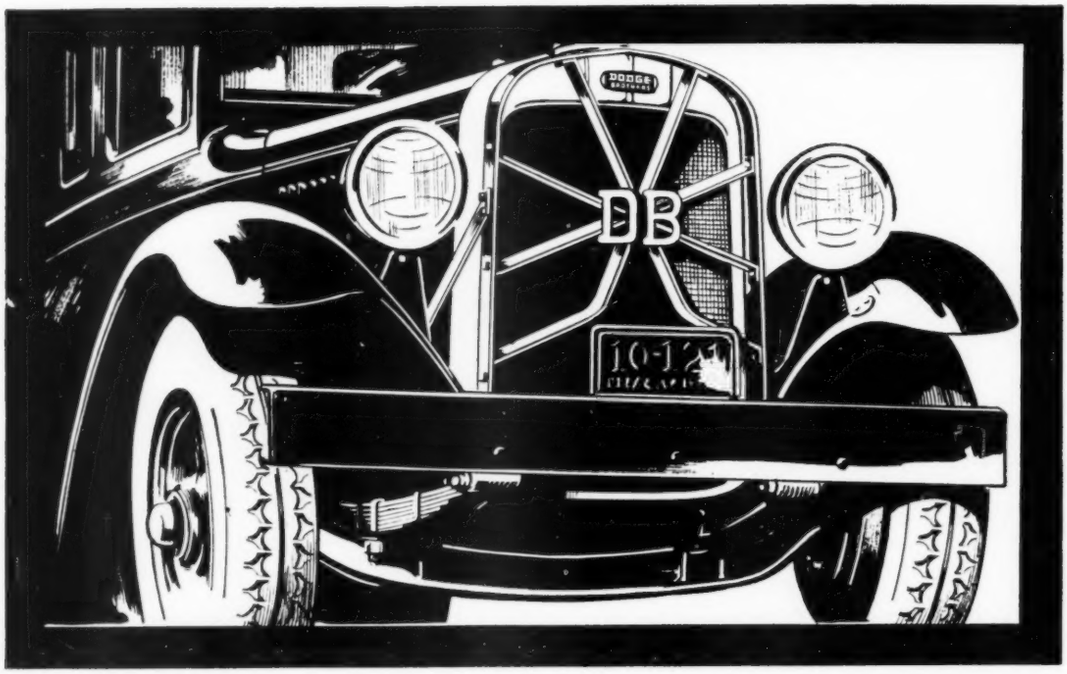
The Gamewell Company, Newton, Mass., has announced that A. R. Welton has been placed in charge of its new Pittsburgh office, which serves Western Pennsylvania, West Virginia and Eastern Ohio. Mr. Welton has been with the Gamewell Company for about two years.

New Dayton-Dowd Appointment

The Dayton-Dowd Co., Quincy, Ill., has announced the appointment of J. B. Downey, 2944 North Second Street, Phoenix, Ariz., as its district sales representative for the state of Arizona, covering the entire Dayton-Dowd line of centrifugal pumping equipment.

Foy Made Kennedy Valve Representative

The Kennedy Valve Manufacturing Co., Elmira, N. Y., has announced the appointment of John J. Foy as its Southern California representative, with headquarters at 210 Transportation Building, Los Angeles, Calif. Mr. Foy has had 15 years of experience in the service of users of valves, pipe fittings and fire hydrants, and will devote himself exclusively to the sale of Kennedy products.



SEE THE COMPLETE HEAVY DUTY LINE

For the heavy duty needs of Contractors, there is now an unusually complete line of Dodge Trucks—ranging in payload capacities from 2950 to 11,175 pounds. They are heavy duty trucks through and through . . . with exceptionally powerful, dependable, economical engines . . . truck-type clutches . . . sturdy 4-speed transmissions . . . deep, rugged frames . . . drive shafts, springs, internal hydraulic 4-wheel brakes and full-floating rear axles (including double reduction) that are brutes for heavy duty work and look the part.

* * *

Inspect, drive and compare these modern heavy duty Dodge Trucks. You will say that they are "all-truck"—that they look able, perform ably and are unusual values on any basis of comparison.

THE COMPLETE LINE OF DODGE TRUCKS RANGES IN PAYLOAD CAPACITIES FROM 1,200 TO 11,175 POUNDS—PRICED, CHASSIS F. O. B. DETROIT, FROM $435 TO $2695, INCLUDING 1½-TON CHASSIS AT $595

SEE THEM AT THE ROAD SHOW-- SPACES 13 AND 15

DEPENDABLE DODGE HEAVY DUTY TRUCKS

During December we hope you will remember to mention THE AMERICAN CITY.

An Earth Borer for Horizontal Holes

An earth boring machine which will bore holes under railroad crossings, paved highways and streets, making it easy to install pipes without the necessity of trenches which tie up traffic, has been announced by the Young Engine Corporation, Canton, Ohio. One of these Young road crossing boring machines made possible the installation of 50 feet of 18-inch pipe under a railroad track in Canton, Ohio, in just four hours.

This boring machine is a horizontal rotary drill using the pipe or casing which is to be installed, and which remains in the ground when the job is completed, as the medium for carrying the rotating cutter head. In operation, the boring machine is placed in the ditch, and the power unit is set up on the bank at the side. Power is transmitted by means of an adjustable drive shaft with universal joints to the upper sprocket of a chain and sprocket drive on the boring machine which can be set at the desired height. This system of power transmission is flexible and adjustable to all operating conditions.

The pipe or casing to be installed is bolted to the rotating hollow driving sleeve by means of 8 x 13½-inch forged steel pipe flanges. A suitable cutter head is attached, usually welded, on the forward end of the casing.

The rotating hollow sleeve is forced forward by jacks, and the rotating power is applied to it by means of a worm-gear reduction. The combined rotating and forward motion of this sleeve forces the pipe into the embankment. Dirt is removed through the hollow sleeve by means of a spoon attached to a long pipe handle, or by water where conditions are favorable.

After the casing has entered the embankment a distance of about 6 feet, or, in other words, when the rotating hollow sleeve has advanced forward to its full extent, the flange of the driving head is unbolted from the pipe or casing and a 5½-foot flanged extension joint is inserted between the rear end of the pipe and the flange of the sleeve, which has been backed to the starting position. This cycle of operations is continued, additional extension 8-inch by 5-foot 6-inch joints being inserted at each full forward movement of the rotating hollow sleeve until the entire pipe or casing has been installed.

When possible and desirable, the entire length of pipe to be installed is welded or screwed into one piece, and the boring machine is placed in the ditch at a distance from the embankment equal to the length of the pipe. The lay of the land sometimes makes this impossible or impractical, in which case the pipe to be installed is made up in lengths as long as can be handled conveniently.

The type of cutter head used depends upon the nature of the ground to be passed through and the size of the casing. For smaller pipes a solid cutter head may be used, forcing the dirt back into the sides of the embankment. With larger casings a hollow cutter head is used, the broken-up dirt being removed by passing it back through the casing and out through the hollow rotating sleeve of the machine.

In long installations, where a great number of 5½-foot extension joints would be required, 20-foot joints are substituted for the shorter extensions after the work has progressed to a point where this is desirable.

The 20-30-horsepower power unit required to drive the boring machine has three speeds forward and reverse and is furnished complete with a weatherproof hood and an adjustable drive shaft with a universal joint.

INSTALLING AN 18-INCH PIPE UNDER A RAILROAD TRACK WITH THE YOUNG BORING MACHINE

A New Low-Cost Pavement

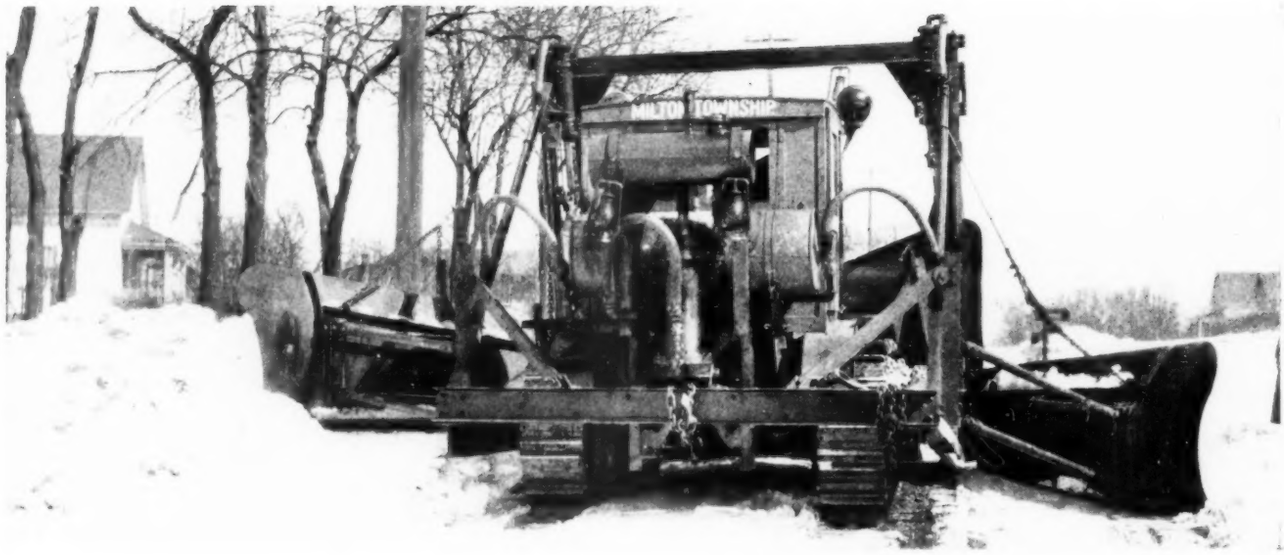
The urgent need for a durable low-cost pavement has long been recognized. Through its extensive research facilities, Warren Brothers Co., Boston, Mass., has long and carefully studied the situation, and has experimented along many lines which seemed to offer prospects of success. The result of this intensive work was the invention of Penolithic, in which the proven principles of asphalt macadam construction have been combined with a new method of coating the road metal. The innovation is that by coating the stone with a mobile non-volatile oil prior to application of the asphalt cement, the covering power of the asphalt is greatly increased, because, instead of merely coating the tops of the stones and then trickling through the interstices between the particles to the foundation or bottom of the layer, the asphalt cement clings to the surfaces of the particles, thus coating the sides as well as the tops of the stones and providing a very effective bond between them.

In laying a Penolithic pavement, a layer of coarse stone is spread over the prepared base, each stone particle approximating the depth of the layer where practicable. The layer is thoroughly compacted with a 10-ton 3-wheel roller, wedging and interlocking the particles. It is then ready for the oil spraying. If desired, the stone may be oil-coated before being spread, or a very mobile, penetrating, non-volatile oil is pressure-sprayed over the layer of coarse stone, thoroughly coating all particles. This oil coating nullifies the effect of the dust-film around each stone and at the same time neutralizes any retained moisture.

Hot pure asphalt is applied to the oil-coated coarse stone layer, the asphalt being of a much harder penetration than could practicably be used on uncoated stone. This is explained by the fact that hot asphalt when applied to cold stone instantly begins to chill and the flow is naturally retarded. In Penolithic there is of course the usual amount of chilling of the asphalt upon contact with the cold stone, but this is definitely offset by the oil coating, which promotes the flow of asphalt in spite of its increasing viscosity.

Over the penetrated coarse stone layer, oiled keystone, passing a ¾-inch screen and retained on a ¼-inch screen, is spread and rolled. The oiling is best accomplished by spraying the stone in piles along the site of the work.

A seal coat of hot asphalt cement is then applied. The final operation is to



when these tracks bite—cities eat . . .

Thanks to open roads, milk trucks are on time

Transferring livestock to fast-moving motor truck saves time and money

767,000 farm motor trucks must be kept rolling all winter, or meals are delayed in millions of homes. Milk, eggs and produce for hospitals and homes await daily arrival of thousands of these trucks. Over 14,000,000 head of livestock arrived by motor truck at the stockyards in 1929.

Snow is the enemy of wheels. Transportation needs the "Caterpillar" track-type Tractor throughout the winter in 36 states to drive back the drifts—to maintain economical transportation by truck and auto—to safeguard profits for the farmer and normal prices for city folk.

Wide, safe roads at small cost unfold behind "Caterpillar" traction.

Prices—f. o. b. Peoria, Illinois

TEN . .	$1100	TWENTY.	$1900
FIFTEEN .	$1450	THIRTY .	$2375
SIXTY . . .	$4175		

Caterpillar Tractor Co.

PEORIA, ILLINOIS, U. S. A.

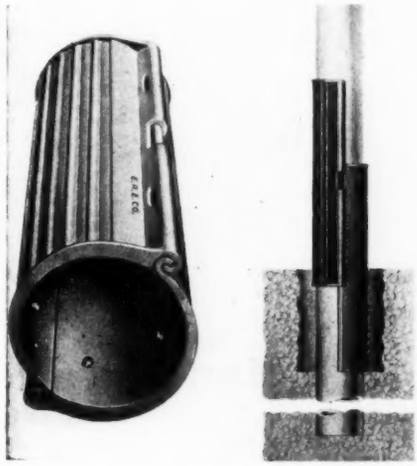
Track-type Tractors Combines Road Machinery

(There's a "Caterpillar" Dealer Near You)

CATERPILLAR

REG. U. S. PAT. OFF.

spread cover stone, passing a ½-inch screen, over the roadway. After final rolling, the road is ready for traffic. The cover stone may or may not be oiled before spreading, but oiling will result in much greater adherence of the particles to the surface, accentuating its natural non-skid qualities, so desirable in the modern pavement.



THE ELRECO SHIELD FOR STEEL POLES

Protection and Reclamation Shield for Steel Poles

Tubular steel poles that have been installed without ground collars and through neglect have become corroded or pitted at the grade line, are being reclaimed through the use of the Elreco protection and reclamation shield, for a very small portion of the cost of new poles, according to the manufacturer, The Electric Railway Equipment Co., 2906 Cormany Avenue, Cincinnati, Ohio.

These shields are assembled from two ribbed, malleable iron duplicate castings with a tongue-and-groove joint, and may be applied directly to installed poles without slipping the sleeve over the top of the pole or removing any attachments, such as cross-arms or span wire bands.

The application requires very little time and expense. The concrete is chipped out to a proper depth below the grade line so that the shield will cover the corroded part of the pole. One-half is placed in position, then the other half is slipped, not driven, into place, and the space formed by a series of lugs between the pole surface and the malleable iron shield is sealed with rich cement grout. In this manner the stress is uniformly distributed over the entire surface of the shield, and the corroded surface of the pole is sealed against further rust. The opening in the sidewalk outside the shield is then cemented, thus assuring a practically new pole at very low cost.

Porous Concrete Strainers for Deep Wells

Draw-down in a well is caused by the inability of a strainer to let in water as rapidly as the pump removes it. The water-level is pulled below its normal level because the strainer lacks sufficient area. The porous concrete strainer developed by F. Thorpe, hydraulic engineer, 1932 Illinois Avenue, East St. Louis, Ill., overcomes this objection, as every square foot of the strainer permits the passage of water.

From ground surface to water, the casing is made of watertight concrete, to keep out surface pollution, and the porous concrete sections are used from water-level to the bottom, making the strainer the full depth of the water in the well. The large area of this concrete strainer increases the capacity, greatly reduces the power cost to pump, and prolongs the life of the water. It keeps the water at a high level when the pump is at work.

In sinking a porous concrete casing, the procedure is as follows: A temporary steel casing is sunk 20 to 40 feet, depending upon the total depth of the well, and excavated by hand, sand-bucket or orange-peel bucket. The cutting edge is then placed over the top of the well, and about five porous sections are assembled on it. These are then lowered into the well, after vertical reinforcing rods are placed in the pipes and grouted with cement. More sections are then assembled, until the top section is about 12 feet above the ground.

All sand is then pumped from the interior of the concrete casing by any of the usual methods. As the sand is taken out, the casing goes down by gravity. This is repeated and more sections are added until the well is completed.

After the well is sunk to the desired depth, the cutting edge is filled with concrete or 4 or 5 feet of gravel placed in the bottom, depending upon the nature of the strata at the bottom. The temporary casing is then pulled out and the well is ready for use. The steel cutting edge is furnished with bolts for lowering and all reinforcing rods necessary. The well driller need provide only his usual outfit for sinking.

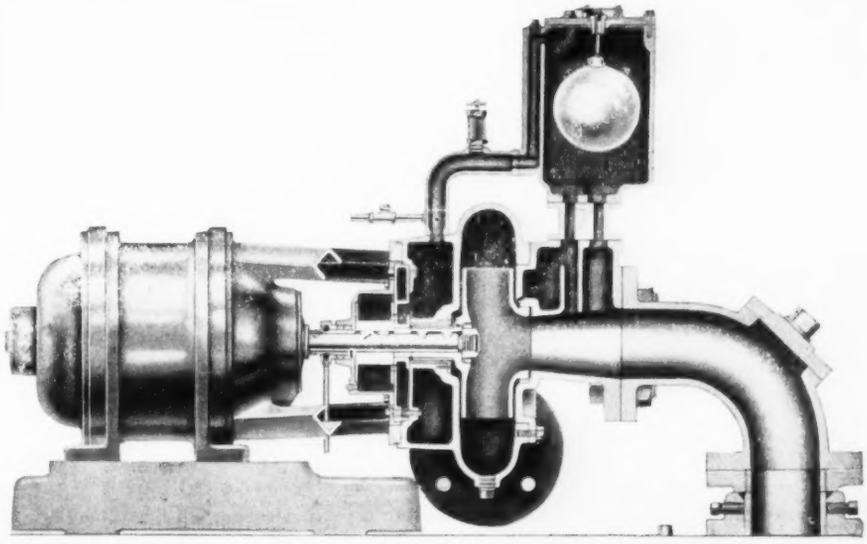
The sections have four pipes cast in the walls. The reinforcing rods are placed in these as the sections are assembled and grouted in with cement, creating a monolithic column of cement and making it impossible for the joints to open in sinking or after they are in use.

A Sewage Pump with Vacuum Rotor

A suction sewage pump which is installed entirely above the sewage, with no working parts submerged, providing quick and complete access to the entire interior, is manufactured by the Nash Engineering Co., South Norwalk, Conn. The pump and motor are horizontal, and the entire unit, including pump, motor and controls, is located outside the pit. This type of installation is made possible by the self-priming feature of the sewage pump.

There are only two moving parts, the centrifugal impeller and the vacuum pump rotor, both revolving without contact. The same shaft supports both, mounted in one casing. The vacuum rotor and the centrifugal impeller operate together. On starting, air is immediately exhausted from the suction pipe. The sewage or liquid rises and reaches the centrifugal impeller. Full discharge pressure and capacity are developed immediately. The vacuum rotor continues to operate, sewage rises in the chamber of the suction controller, lifts the ball float and opens a valve to the atmosphere. Air then enters this special chamber and unloads the vacuum pump and prevents sewage from being carried over into it. The air pump is sealed by clean water from the fresh water supply. In addition to priming the centrifugal pump, the vacuum pump operates continuously, removing gases and air from the entering liquid. The centrifugal pump thus cannot become air- or gas-bound.

The centrifugal impeller is of the non-clog type, offering clear, ample passages for solid matter. In addition, the entire impeller interior is smoothed and faired, removing all projections on which solids might lodge.



SECTIONAL VIEW OF THE JENNINGS SUCTION SEWAGE PUMP

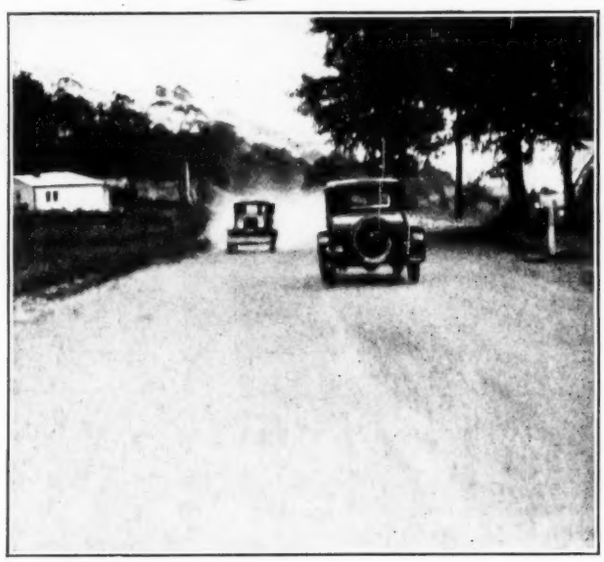
Include
CALCIUM CHLORIDE
in your 1931 Budget

for

Road Maintenance and Dust Laying

It

will save and preserve many thousands of dollars worth of your road surface materials



Road officials find it ill economy to spread carloads of gravel and other valuable road surface materials and then have them ground to dust by traffic and blown away.

Calcium Chloride is low cost insurance against this destruction. It provides constant moisture that is needed to bind these materials together. It prevents the road from drying up and rutting.

Frankly, Calcium Chloride may cost less than the road surface materials you will lose without its protection . . . to say nothing of damaged roads and dust nuisance.

Two and one-half pounds of Calcium Chloride will properly protect one square yard of road for a season. Why not send the coupon today for literature and prices on your 1931 requirements?

Send the coupon to any one of these companies

The Dow Chemical Company, Midland, Michigan
The Columbia Products Company, Barberton, Ohio
Solvay Sales Corporation, 61 Broadway, New York City

Please send literature and prices on ____ tons of Calcium Chloride.

Name _____

Position _____

Address _____

AC 1-31

CALCIUM CHLORIDE PUBLICITY COMMITTEE

F L A K E
CALCIUM CHLORIDE
lays dust . . . preserves the road

ELECTRO-MATIC PEDESTRIAN CROSSING SYSTEM INSTALLATION AT A SCHOOL CROSSING

Taking Care of the Pedestrians at Street Crossings

The Pedestrian Crossing System which has been devised by the Automatic Signal Corporation, New Haven, Conn., in connection with the Electro-Matic system of traffic control has been designed and constructed expressly for the safety of pedestrians and provides a protection that has never before been available. It is a system that affords maximum protection to the pedestrian with the very minimum of delay to the motorist. It is especially applicable at trolley stops and at schools, theaters, churches and other similar locations, and is equally effective in the downtown business areas and fast-traveled highways and boulevards.

In the absence of pedestrians who wish to cross the thoroughfare, the vehicular traffic continuously holds the right-of-way. Push-buttons are provided at convenient points, and when a pedestrian who wishes to cross the thoroughfare pushes this button, the signal flashes a warning to the vehicular traffic, then stops it and gives the pedestrian the right-of-way. This right-of-way is maintained for a sufficient length of time to allow the pedestrian to cross in safety. The signal then flashes a warning to any other pedestrians that may have just arrived at the intersection, informing them that the walking period has nearly expired, and the right-of-way then reverts to the traffic on the highway. The right-of-way remains on the highway until other pedestrians indicate their desire to cross the street.

In order to prevent a large group of pedestrians from monopolizing the signal, provision is made that the "Go" signal when returned to the highway remains there for at least a fixed period of time, which is adjustable from ½ to 1½ minutes. Pedestrians pushing the button during this fixed period are "remembered" by the control, and at the expiration of the period right-of-way is accorded to the waiting pedestrians. This forms the pedestrians into groups, and allows them to cross the street together—the safest and most efficient method of crossing a highway.

The Electro-Matic pedestrian crossing system is used with both the two-color and the three-color signal lights. The usual arrangement with the two-color signal light is to have a flashing amber shown to all traffic. When a pedestrian pushes the button, the flashing amber, after a warning, is changed to red for the motor traffic, and at the same time the pedestrian crosswalk is shown either a green light or some other walk signal.

When the pedestrian crossing control is attached to the standard three-color signal light, the customary green, amber and red lights are usually used. When this type of signal is located near or at an intersection of a major highway with a minor street, the minor street is shown a flashing signal to warn vehicles approaching on that street to proceed with caution. At the same time the major highway is shown a flashing green, so that traffic passing on the highway may know that it has not absolute right-of-way.

When a signal is established primarily for the protection of pedestrians, it is wise, not only for the information of the pedestrians themselves, but also so that the motorist may realize the purpose and functions of that particular signal light, to mark it with some identifying symbol. The letters "P X" are used for that purpose.

Pomona Pump Company Promotes T. C. Butler, Jr.

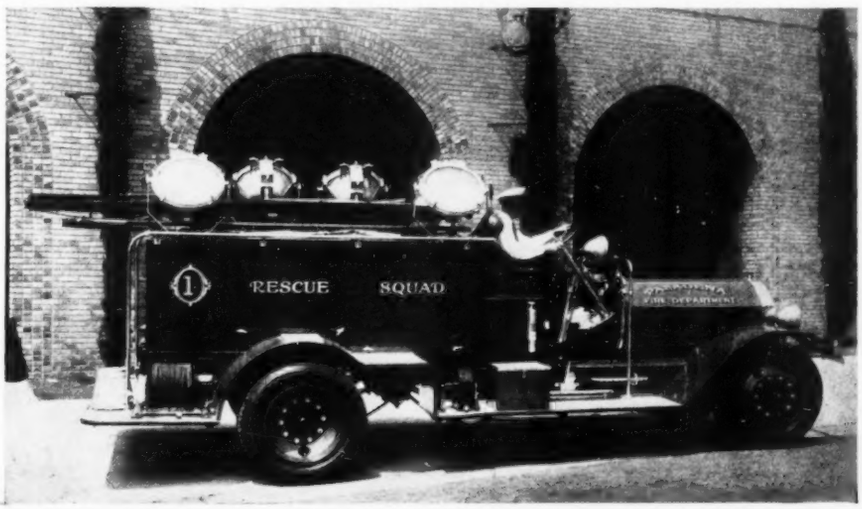
T. C. Butler, Jr., California sales manager of the Pomona Pump Co., Pomona, Calif., for the past two years, has recently been promoted to the Interstate Sales Department of that organization. Strengthening of this department became necessary because of the large sales increase of Pomona Pumps throughout the United States. For fifteen years prior, Mr. Butler was Research Manager for the Indian Motocycle Co.

Other important departmental changes include the promotion of C. L. Barrett to the position of California sales manager, and of G. L. Blanchard to that of assistant California sales manager.

Fire Department's Rescue Truck Equipped with Portable Floodlights

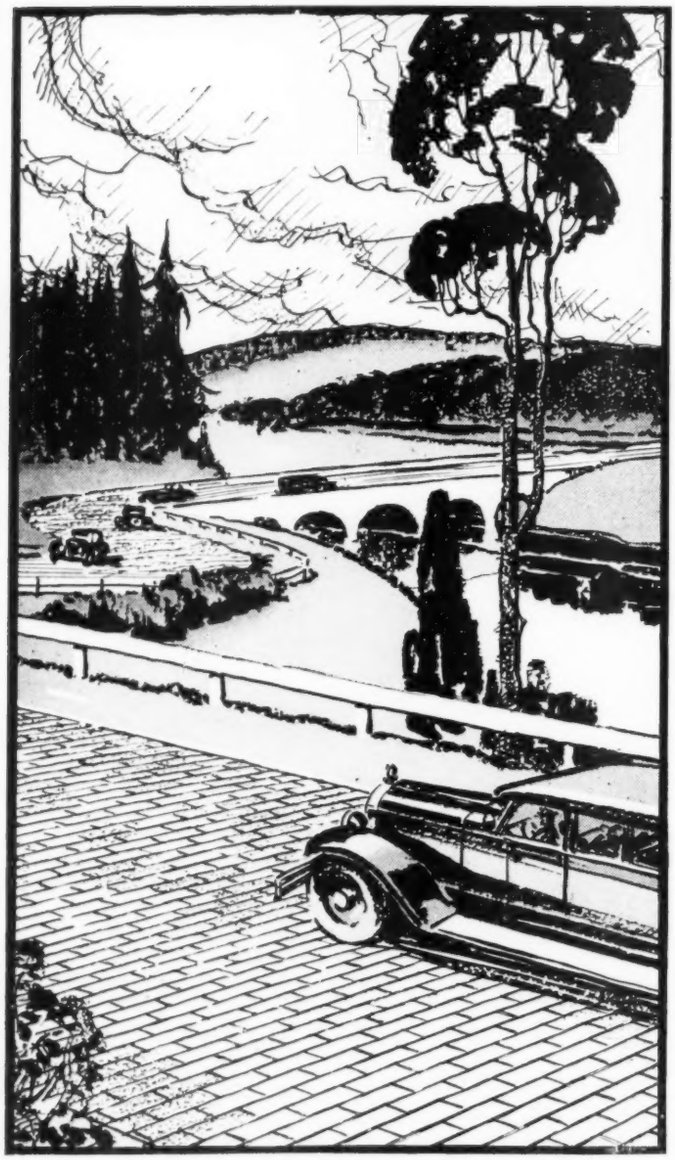
One of the important features of auxiliary fire-fighting equipment is a rescue truck which does not carry strictly fire-fighting equipment, but such aids as will make the work of pumpers and chemical engines more effective. The Pasadena, Calif., Fire Department has built a rescue truck according to its own specifications, using a Seagrave chassis which formerly carried a 350-gallon pump. This rescue truck is equipped with four specially built hand-operated Reelites made by the Appleton Electric Co., 1701-29 Wellington Avenue, Chicago, Ill. A Reelite is a caretaker for current-conducting cable. These special hand-operated Reelites pay out the cable, but it must be wound up by hand. It protects the cables from kinks, breaks and tangles. The two large Reelites on the Pasadena rescue truck each carry 250 feet of No. 16 two-conductor cord, and the two smaller Reelites each carry 300 feet of No. 18 two-conductor junior cord.

The portable floodlights are fastened temporarily on the top of the truck, and are detached and used in connection with the cord attached to the Reelites, enabling the men to carry them into dark places and close to the fire. The electric current for lighting these floodlights through the Reelites is furnished by a Kohler portable light plant mounted on the chassis, but it does not show in the illustration. Specially built protecting cases are placed over the Reelites when not in use.



THE PASADENA, CALIF., RESCUE TRUCK, WITH FOUR PORTABLE FLOODLIGHTS EQUIPPED WITH REELITES

These Advantages [Low upkeep . . . Long life . . . Imperviousness to weather and climate . . . Certainty of good construction . . . Easy riding . . . Attractive] Are Had In Brick Pavements



WHEREVER comparative costs are kept, the practical economy and wisdom of brick surfaced roads and streets is borne out.

For complete data address: National Paving Brick Manufacturers Association, 1245 National Press Building, Washington, D. C.

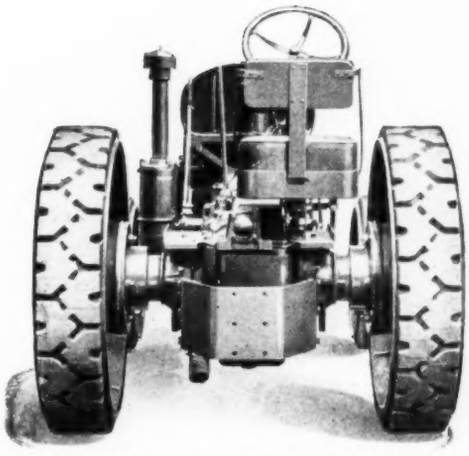
The National Paving Brick Manufacturers Association will be an Exhibitor at the 1931 Road Show A.R.B.A., St. Louis, January 12-16.

Twenty-fifth Annual Meeting of the National Paving Brick Manufacturers Association will be held at William Penn Hotel, Pittsburgh, Pa.—Brick Paving Technical Sessions February 5-6, 1931.

VITRIFIED

BRICK PAVEMENTS

FACE THE FUTURE «» PAVE WITH BRICK



REAR VIEW OF THE NEW MODEL 30 McCORMICK-DEERING TRACTOR

A New Model Industrial Tractor

A Model 30 McCormick-Deering tractor is the latest addition to the industrial power family of tractors manufactured by the International Harvester Company of America, 606 South Michigan Avenue, Chicago, Ill. The Model 30 is similar in construction to the Model 20 except for its increased capacity. It has forward speeds of 2.5, 4 and 6.7 miles per hour.

The Model 30 industrial tractor is powered by a 4-cylinder valve-in-head engine. The cylinders have a bore of 4¾ inches and a 6-inch stroke. Operating at the governed speed of 1,050 r.p.m., it develops over 40 horsepower on the belt. The belt pulley can be replaced by a sprocket or a shaft power take-off. Outstanding among the features of this new tractor are the removable cylinders and crankshaft ball bearings. The removable cylinder feature is mentioned because it is a well-known fact that cylinders will wear after years of use. In order to compensate for this wear, it is necessary to do one of three things: first, replace the engine block; second, rebore the block and buy oversize pistons; or, third, replace the cylinders. The third or last of these is far more economical and at the same time retains the original size of the cylinders.

The foundation of the Model 30 industrial tractor is a one-piece main frame. This construction is designed to eliminate twisting, weaving, and warping of the frame. Each unit, including the engine, clutch, transmission, final drive, etc., is assembled complete and then placed in the main frame. This method of unit-construction reduces adjustment and overhauling expense to a minimum. It also permits ready disassembly if service is required while working on a job. Ignition is supplied by a high-tension magneto, lubrication is of the circulating splash type, and the Model 30 is equipped with a built-in oil filter for conserving the lubricating qualities of the oil. The carburetion system is equipped to operate on kerosene or gasoline. It has an 86-inch wheelbase and a total over-all length of 129 inches. It is 66 inches wide and 70 inches high to the top of the steering wheel. The tread is 52 inches wide in front and 54 inches wide in the rear. The tractor has a turning radius of 16½ feet. Heavy-duty internal self-energizing brakes and auxiliary hand brake operating on the countershaft are regular equipment. The rear tires are quickly removable.

A Continuous Filter for Dewatering Sewage Sludge

The whole history of engineering progress in the United States has always included a liberal adaptation of the methods developed in one industry where profitable for a companion industry. A most interesting example has been the successful adaptation of the Oliver continuous filter, developed in the metallurgical industry, for handling mineral concentrates and ore slime, to the dewatering of activated sewage sludge. Naturally, some features of its construction as used in metallurgical work required a certain amount of modification for successful use in activated sludge filtration.

Many of these filters have been installed for this work in the United States and the latest installation has been made to handle activated sludge for Nagoya, Japan, the third city in population in that country.

The general constructional features of the Oliver filters in activated sludge filtration comprise a rotating cylinder which is the filtering element proper contained in a sludge tank, in which the filter cylinder revolves with its axis horizontal.

The external surface of the cylinder is covered with a woven cloth filtering medium, usually wool, upon which a vacuum operates through suction on piping inside the cylinder, and connects at suitable points with the undersurface of the woolen cloth.

The filtrate, which is the water passing through the cloth from the sludge, is conducted through these pipes, which unite and pass out from the cylinder through a manifold arrangement and an automatic valve located in one hub of the cylinder's axis.

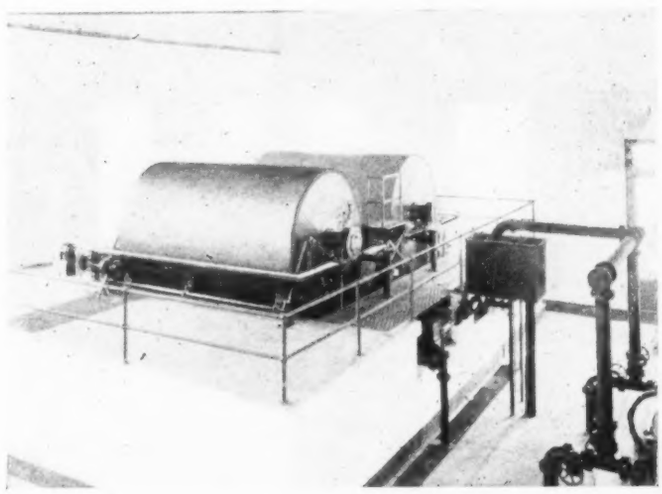
By slow rotation of the filter cylinder the dewatered sludge cake accumulating on the surface of the woolen cloth emerges from the sludge level in the containing tank and undergoes further drying by vacuum suction until it is discharged from the filter surface by an automatic cut-off of the vacuum and reversal of pressure by a few pounds of air pressure.

In general, the settled activated sludge sent through the Oliver filters will range from 98 to 99.4 per cent water, and usually on leaving the filter the cake of filtered sludge will contain 80 per cent water; less than 77 per cent water and more than 85 per cent water in the filter cake is very unusual.

With 98 per cent water in the feed, 1 pound of dry sludge would be accompanied by 48 pounds of water. With 80 per cent water in the filter cake, the same pound of dry sludge would have only 4 pounds of water. With a reduction of 49 pounds to 4 pounds, the filter has removed 91.8 per cent of the water—an excellent performance for this class of work.

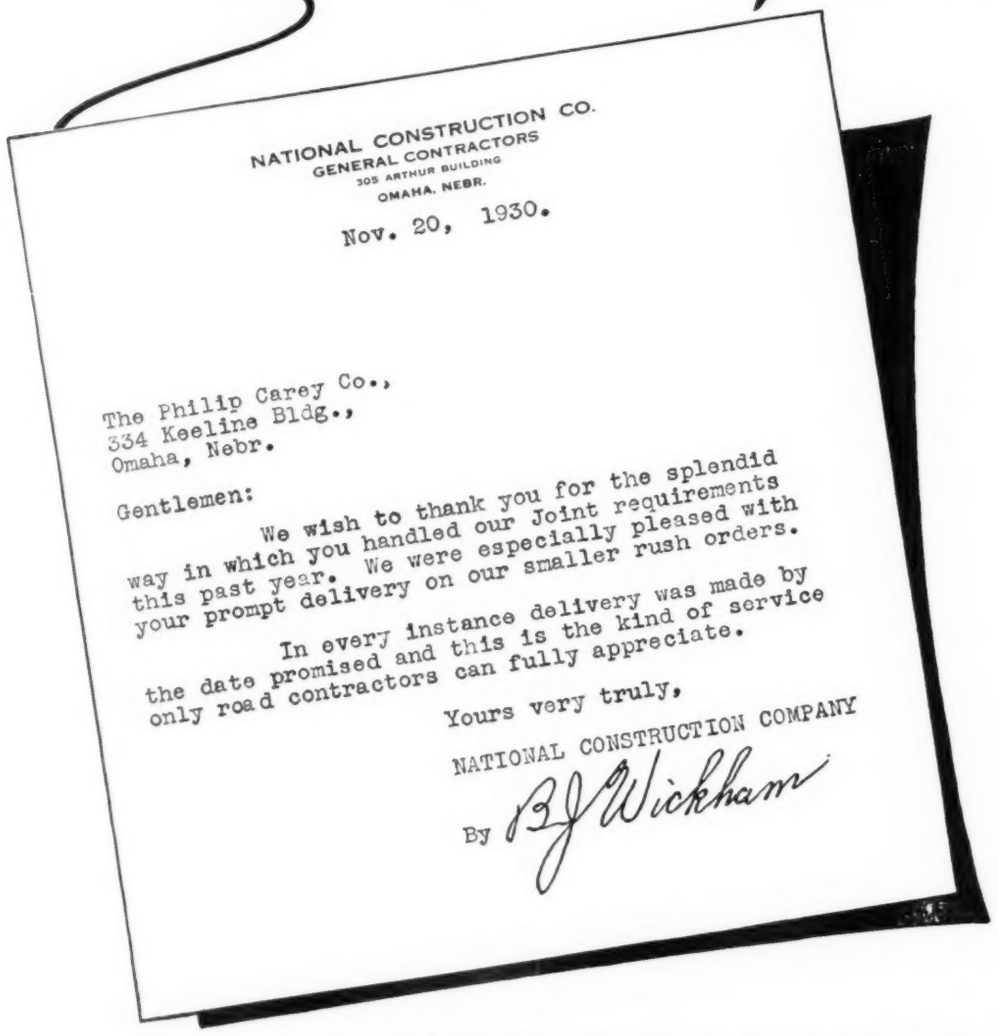
Special features of design include copper fittings and wood stave shell on the drum or cylinder, to resist action of ferric chloride, in general use as a necessary coagulant for sludge prior to filtering. The woolen cloth is also a vital element in design, giving much better performance and longer life than cotton cloth. The spiral winding of copper wire on the surface of the cylinder permits the use of woolen cloth, which has little resistance to sagging effect, and if used without wiring soon pulls into a shapeless bag. The wire winding keeps the wool cloth in perfect condition, lasting over six months in use before cloth replacement is needed.

Although operations in the plant are governed generally by pH control, the filter attendants soon become remarkably skillful in recognizing changes in sludge condition by the appearance of sludge cake on the cylinder surface and the sludge in the tank in which the cylinder



OLIVER UNITED SLUDGE FILTERS IN THE RECENTLY COMPLETED ACTIVATED SLUDGE FILTRATION STATION AT CHARLOTTE, N. C.

Service—the kind you want



NATIONAL CONSTRUCTION CO.
GENERAL CONTRACTORS
305 ARTHUR BUILDING
OMAHA, NEBR.

Nov. 20, 1930.

The Philip Carey Co.,
334 Keeline Bldg.,
Omaha, Nebr.

Gentlemen:

We wish to thank you for the splendid way in which you handled our Joint requirements this past year. We were especially pleased with your prompt delivery on our smaller rush orders.

In every instance delivery was made by the date promised and this is the kind of service only road contractors can fully appreciate.

Yours very truly,

NATIONAL CONSTRUCTION COMPANY

By B J Wickham

See us at Booth A-80
at the Road Show

CAREY Elastite Expansion Joint is on the job when needed —and you know what that means on concrete paving. Stocks are carried in every important city in the country, and any size order can be delivered without delay.

CAREY Service keeps pace with the demand for Elastite Expansion Joint, which has proved its value in concrete paving for almost 20 years. Road builders who wish a proved product and insurance against costly delays, depend on CAREY Elastite. Write for current price list and trade discounts.

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ELASTITE BRIDGE FLOORING
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ROOF COATINGS
WATERPROOFING MATERIALS
ELASTITE RAIL FILLER

Carey Elastite EXPANSION JOINT

THE PHILIP CAREY COMPANY — Lockland, Cincinnati, Ohio

revolves. For this reason the fact that the entire surface of the cylinder is always in plain view is decidedly a benefit in operation.

The discharged filter cake is disposed of variously—by drying for fertilizer in heat dryers or by spreading directly on the land as fertilizer.

As the filtrate is clear water, it is pumped from the filter to the effluent channel in the plant. Its handling is simple and offers no feature for comment.

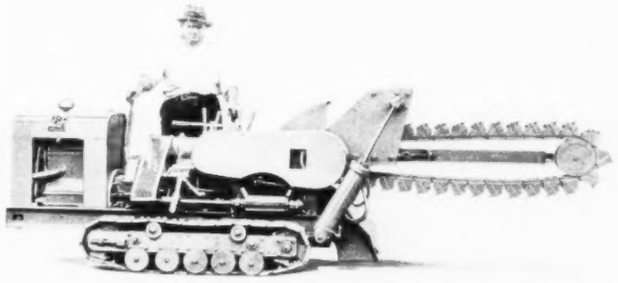
The Oliver sewage filter is made by the Oliver United Filters Inc., of New York, Chicago, and San Francisco, with installations in the sewage disposal plants of Milwaukee, Wis.; Pasadena, Calif.; Chicago, Ill.; Charlotte, N. C.; Gastonia, N. C.; High Point, N. C.; and Nagoya, Japan. The same company also makes the American disc filter for sewage filtration, and four units of this type have been supplied to the city of Houston, Texas.

Modern Methods of House Numbering

A proper house-numbering plan for cities and a properly displayed number at each address are required by the United States Post Office Department as a preliminary condition of free mail delivery. In spite of this fact and in spite of the often grave consequences of delays when police, fire or other emergency departments are summoned, many cities are still struggling along with old haphazard numbering plans that are sometimes almost worse than no plans. In one street of a Boston suburb, a dwelling in the middle of a block is numbered "40" while the house next door is "70." All the buildings on this street are set back and on a terrace where the discrepancy causes a maximum of inconvenience. On Fifth Avenue, New York City, one of the most famous streets in the world, there are facing buildings the numbering of which shows a wide discrepancy.

It is not possible to apply any one simple numbering system to conditions of all cities, because of varying topography and of the bewildering network of streets, in cities that grew up under the old, planless conditions. But there are several plans some one of which may usually be adopted in working out a city-wide house-numbering system fitted to the individual requirements of the case, and conforming with sound current practice in the municipal engineering field. Some of these plans may serve definitely to locate the numbered building as being in a particular section of the city, or as being, approximately, a given distance from another definite point in the city.

One organization which has made a most thoroughgoing study of house-numbering practices now in effect in American cities, as well as of standards of numbering, has just issued a substantial research report, "Modern House Numbering Methods," in which the best systems now in use are described. These include "The Philadelphia Plan," and "The Continuous Plan," with discussions of special applications of these systems, provisions for park areas, back-yard buildings, multiple structures, short-length streets, fractional lots and water-front property. A model house-numbering ordinance is suggested for putting into effect a renumbering plan with a minimum of confusion. This ordinance is now in use in the state of Iowa and covers the so-called "Philadelphia Plan" exclusively. Premax Products, Inc., Niagara Falls, N. Y., are manufacturers of high-grade house numbers, and publishers of some valuable studies of standards for numbering systems on which the literature is rigidly limited. The present study is available to interested public officials and civic organization secretaries faced in their own communities with a renumbering problem. In addition to other data it gives specific instructions for placing numbers for maximum legibility under different conditions.



THE NEW C. H. & E. LITTLE GOLDIGGER TRENCHING MACHINE

A New Ditcher for Small Trenches

The great amount of hand work required in digging ditches for laying small pipes brought about the development of the Little Goldigger by the C. H. & E. Division of the National Equipment Corporation, Milwaukee, Wis. This ditcher, only waist-high, not only digs the ditch faster than hand work, but removes a comparatively small amount of dirt because of the narrow trench, thus reducing backfilling.

The C. H. & E. Goldigger is designed and developed to dig a trench from 3 inches to 6 inches wide for gas service connections, high-pressure gas lines, small oil pipe lines, ornamental lighting cables, telephone cables, sprinkling and drain pipes in golf grounds and airports, and in any other underground work that requires a trench up to 6 inches in width and 48 inches in depth.

The digging speeds vary from one to six feet per minute. Two speeds are available without changing sprockets, and 36 speeds may be had by changing sprockets. Full multiplane traction with very low ground pressure permits operation on wet soil without miring and on lawns and parkways without injury to the grass.

The operating levers have been centralized on one side of the machine for the convenience of the operator in keeping his machine digging to the best advantage at all times. It can be used in very small spaces, and its narrow width will allow it to pass buildings, trees, electric light and telephone poles, where the clearances are small.

Rugged construction has been well balanced throughout the machine. All parts are built for severe and continuous service, the gears and sprockets are of steel properly heat-treated, and the gears are enclosed in cases and run in oil. The oil in the main gear case is used for the hydraulic boom lift and is circulated back over the top of the gears in the case, giving them a continuous oil bath. A 4-cylinder, 12-hp. engine provides power for all operations.

Joslin Moves General Offices

The general offices of the A. D. Joslin Manufacturing Co. have been moved from Manistee, Mich., to Chicago, Ill.; where they will be located in Suite 1161 in the Merchandise Mart, 220 No. Bank Drive.

The Merchandise Mart is at present the largest building in the world. Manufacturers and wholesalers have their products on display at all times, so that a visiting buyer need not go out of the building when completing his stock. The A. D. Joslin Manufacturing Co., in line with its policy of progressiveness, recognized the advantage of this location. Its line of street signs, traffic signs, reflecting jewel signs, house numbers, license plates and municipal supplies will always be on display.

Gorman Joins Pardee Engineering Company, Inc.

Arthur E. Gorman, formerly Chief Sanitary Engineer in charge of chlorination control for the city of Chicago, has resigned his position with the Wallace & Tiernan Co., Newark, N. J., to take charge of the marketing and sales for the Pardee Engineering Co., Inc., Long Island City, Long Island, N. Y., manufacturers of chlorine and ammonia control apparatus in the entire territory west of the Alleghany Mountains. Mr. Gorman's headquarters will be located in the Engineers Building, Chicago.

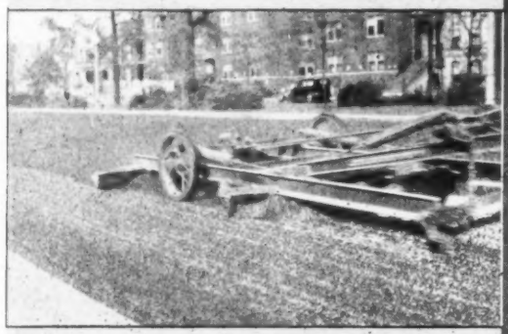
At the annual meeting of the stockholders in December, Mr. Gorman was elected a member of the Board of Directors.

Ward Joins A. G. A. Sales Staff

The American Gas Accumulator Co., Elizabeth, N. J., has announced that C. A. Ward, formerly sales manager of the Essco Manufacturing Co., Peoria, Ill., is now associated with A.G.A. Co., in the sales of traffic devices and airport lighting equipment. Mr. Ward's headquarters will be at 127 North Dearborn Street, Chicago, Ill., where he will take charge of a district which includes a group of Central Western states.

Many Miles of CHICAGO BOULEVARDS Surfaced with STANOLIND CUT BACK ASPHALT

Showing first application of Stanolind Cut Back Asphalt on roadway to be surfaced.



Mixing mineral aggregate and Cut Back Asphalt on the roadway.

Rolling after completely mixing and surfacing on the roadway.

Completed Roadway.

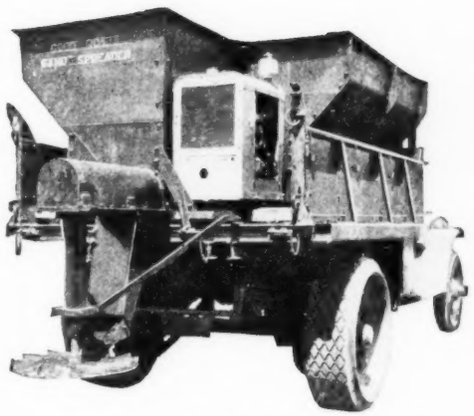
THE BOULEVARDS in the Park Systems of Chicago are the heaviest traveled in the world, carrying passenger cars and double-decked buses.

The section of pavement shown here is being surfaced with Stanolind Cut Back Asphalt. This method of maintaining paving and building up the thickness is being used to a greater extent each year. It is not an experiment, but a practical solution of maintenance problems, and has been giving satisfactory service for over five years.

The services of the Standard Oil Company engineers are available to those who wish further details on this type of construction.

STANDARD OIL CO. (Indiana)
910 S. Michigan Avenue Chicago, Illinois

ASPHALTS FOR EVERY PURPOSE



THE GOOD ROADS SAND SPREADER

Sand Spreaders for Winter Maintenance

Slippery streets and roads, particularly at intersections and curves and on grades, are a great menace to the traveling public and always have been. The real danger comes later in the winter when there is more apt to be thawing followed by freezing temperatures in alternate periods. The Good Roads Machinery Company, Inc., Kennett Square, Pa., has developed the Good Roads sand spreader, which spreads sand or ground cinders on highways or city streets when these are rendered unsafe because of ice or snow.

This spreader is built as an independent unit, so that it may be placed within the body of a truck and temporarily secured thereto or placed directly on the truck chassis. It consists of a steel hopper, screw conveyor, spinner disc, gasoline engine, drive gears, shafting and bearings, all mounted on channels as a single unit.

The device is made with two speeds of the conveyor, so as to vary the quantity of sand delivered to the spinner, and consequently to the road surface. The amount of sand delivered to the road also depends on the speed at which the truck is being operated. With the high speed on the conveyor and low speed on the truck, very much more sand will be delivered to the road than if the low speed is used for the conveyor and a high speed on the truck.

It is not necessary to dry the sand before loading the spreaders, as the device will work either with dry or damp sand. It is, however, advisable to mix a thawing agent with the sand when working in very cold weather, to prevent the mass from freezing solid. Should freezing occur, however, provision is made for thawing out by means of a steam jacket placed around the conveyor trough. A pipe connection is provided on this steam jacket, and steam may be used for thawing out before starting the run, or the exhaust from the operating truck may be connected up with the steam jacket.

The spreader is built with a separate motor unit so that it is independent of the truck power and may readily be removed therefrom or changed to another truck without any changes except that of securing it to the body or chassis on which it is to be used. It will normally throw the sand over a 9-foot width. To accomplish this, the spinner should be adjusted so as to be about 14 inches from the road. In designing the machine it was determined that about ½-ounce of sand per square foot of surface would be adequate for most purposes, but this may be varied with the combinations of speed that may be obtained.

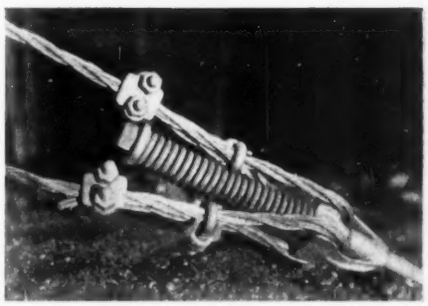
The body or bin of the machine will hold approximately 6 cubic yards of sand, and this, under normal conditions, will spread about 3 miles of sand 9 feet wide.

The conveyor is a cast iron screw operating in a trough at the bottom of the bin. The conveyor delivers the sand to a chute at the rear, which conveys it to the horizontal spinner, from which it is thrown to the road. The control is by means of two clutches, giving a high and a low speed to the screw by means of sprocket and chain drive. All shafting is mounted in anti-friction bearings, and all drives are by means of sprockets and chain, except the spinner, which is a spiral bevel gear heat-treated and hardened.

Taking the Sag Out of Highway Guard Cable Installations

Varying sags of highway guard cables, resulting from expansion and contraction from season to season, have suggested the development of the new type of cable anchorage and attachment devices recently announced by the Malleable Iron Fittings Co., Branford, Conn. Assuming that the cables are clamped up to the desired tension in the heat of the summer, slacking-off of the cables is necessary to compensate for the contraction of the approaching winter, or else the posts are pulled out of line, or the anchors disturbed by the greatly increased strain resulting from the contraction. The reverse is true if the cables are clamped up to the required tension in cold weather.

The compression spring anchorage developed by the Malleable Iron Fittings Co. compensates for changes in the lengths of cables with only relatively slight variations in the tension of the cables. A double thimble strain block to which the cable ends are clipped, slides on the anchor rod, and the compression of the spring balances the tension of the cables at all times, until the spring is fully compressed. One type of spring is rated at 880 pounds, fully compressed, and another at 1,650 pounds. The use of this compression spring anchorage provides a neat, businesslike installation with taut cables at all seasons and without maintenance for slacking-off and pulling-up on the cables. This unit also acts as a shock-absorber, up to the limit of its capacity when a car hits the fence. If even tensions are required, closer to a standard than the varying compression of the spring will give, then the compression of the spring may be varied without changing the cables, merely by turning the nut at the upper end of the spring.



A COMPRESSION SPRING ANCHORAGE

The problem of attaching the cables to the posts, firmly and yet leaving them free to slip in order to transmit strains from cars out of control to the anchors at either end, has been solved by the offset pillow block unit with a special shoulder type J-bolt. This operates satisfactorily with concrete posts, and a similar type is available for use with wood posts.

Installations of these highway guard cable fittings have been made near Sheffield, Mass., and in places in Maine, New Hampshire, Vermont and Connecticut. Adapter construction with a clevis nut makes the compression spring anchorage available for use with anchor rods already installed. For shorter stretches of fencing, one unit at one end with turnbuckle construction at the other end may be adequate. For longer stretches it is recommended that the compression spring anchorage be furnished at both ends. The double strain block may be used on the anchor rod without the compression spring for another set-up, or it may be incorporated as part of the turnbuckle construction.

AN OFF-SET PILLOW BLOCK INSTALLATION WITH J-BOLT AND COMPRESSION SPRING ANCHORAGE

New Port Facilities for Sandusky, Ohio

The city of Sandusky, Ohio, has engaged MacElwee & Crandall, Inc., consulting engineers, Cambridge, Mass., to make a thorough study of the existing port facilities of Sandusky, and the relation of these to present and future industry, and to prepare a report upon a comprehensive plan for the logical future development of the port. This same firm is now engaged on a similar investigation for Green Bay, Wis.

Outdoor Lighting

A Section of *The American City*
Devoted to the Lighting of Streets, Highways, Airports, Athletic Fields and Parks, and the Floodlighting of Public Buildings

A Municipal Activity of Growing Importance

SINCE the nights of the Dark Ages, appropriately named, when the citizen venturing on the streets carried his own torch to light his way, or, for greater security, proceeded with a group attended by torch-bearers, the progress of technology in various fields has contributed to the gradual increase in outdoor illumination, and the safety, convenience and beauty that result. Candles, oil, gas and electricity, calling for such diverse activities as whaling, coal mining and the intricacies of electrical engineering, have successively dominated the lighting field, indoors and out. Costs have been reduced, illumination intensities have increased, convenience and certainty of operation have been furthered.

Advances in the general art of lighting have come none too soon in regard to street lighting, for the needs in this field have increased tremendously. To the original requirement that men afoot or in horse-drawn vehicles could find their way about at night was added an appreciation of improved lighting as a form of protection against robbery and attack —a function that has become no less important in recent years. Then came the automobile, which has revolutionized street-lighting requirements as well as the streets and highways themselves. Light intensity and distribution adapted to rapidly moving traffic are demanded, and a new safety consideration has developed—the danger of accidents to pedestrians and motorists, chargeable to inadequate lighting.

Outside the cities the great field of highway lighting is calling for attention. Considerations of safety, comfort, and the more complete utilization, by night driving, of the great public investments in highways, are giving impetus to efforts for adequate road lighting. Removal of the necessity for glaring headlights is an objective looked forward to.

Airport lighting, the initial activity of which has slowed up with the lessening of airport construction, may nevertheless be confidently expected to achieve a continuing and healthy growth; for relatively few of the many airports existing have adequate lighting equipment, and the potential effectiveness of a port is greatly lessened by the absence of such facilities.

A further important phase of outdoor lighting has to do with sports and recreation. The possibilities of outdoor play at night, greatly adding to the number of participants or spectators, are fast being realized, with many notable installations by public and private interests.

Quite apart from the utilitarian motive, there is an increasing application of light in the floodlighting of buildings. In the case of private structures the advertising impulse, with the thought of ultimate financial returns, may frequently dominate; but with respect to public buildings, where the practice is also spreading, esthetic considerations must take precedence, for whatever publicity may be desired incidentally must depend on the inherently beautiful effect.

Because of the increasing importance of outdoor lighting—primarily a municipal function—and the variety of forms that it is taking, THE AMERICAN CITY is devoting increased attention to it with the advent of the new year.

Chronology of Street Lighting in New York

1697—Candle lanterns required to be hung out by householders.

On moonless winter nights a candle lantern was ordered to be hung on a pole at every seventh house, the inhabitants of each seven houses to contribute equally.

1752—Three whale-oil lamps placed outside City Hall. The first municipal street lighting.

1823—Gas lighting company organized.

1826—120 open-flame gas lamps placed on Broadway, replacing 75 oil lamps.

1857—Gas lighting extended to vicinity of 86th Street, preceding sidewalks and graded roads.

1881—Electric arc lamps installed in Madison Square and Union Square, on high masts.

1895—Enclosed arcs and incandescent carbon-filament lamps introduced.

1896—Gas-mantle lamps used.

1907—Tungsten-filament lamps (vacuum type) introduced.

1913—Gas-filled tungsten lamps replaced older tungstens and arcs.

Street Lighting in the Metropolis

NEW YORK CITY has, in the lighting of its streets, an enterprise which involves five and one-half millions of dollars of annual expenditure, but which is taken for granted and is almost never a matter of public discussion. One of the few instances when popular attention was directed to this activity in any comprehensive way, was in the year just past, when the city's Chief Engineer of Light and Power described the city's street-lighting system and its development, over the municipal radio station; and on the opposite page Mr. Kelly presents some of its chief features. A outline of its historical progress, which epitomizes the evolution of street lighting generally, is given herewith.

In carrying on this huge enterprise the city has pursued a conservative course, not marked by spectacular innovations or sweeping changes, but exhibiting steady, gradual improvement as conditions have demanded from time to time. The charge of being old-fashioned has been leveled against New York street lighting, but in this case the accusation need not be considered too condemnatory, for the city has, by and large, retained various of the better features of its long-established lighting practice, including generally attractive, graceful standards, reminiscent of European influence. One element in particular that has marked the metropolitan system has been its reliance upon pendent lamps throughout a period where a great many other cities have gone in for upright and more showy units. The officials of the street-lighting division now feel a certain satisfaction in the trend becoming evident in the most modern practice to employ pendent units projecting over the roadway.

One of the types of street-lighting standards most evident to the visitor from other American cities is the bishop's crook standard, which is widely used, particularly in the older and more settled sections like Manhattan and parts of other boroughs. This type is almost a rarity elsewhere in the country, although frequently encountered in Europe, and accordingly has been char-

acterized as "quaint." Nevertheless, it has a certain charm and appropriateness to the city's atmosphere. Although the lamp hangs quite close to the post, at a distance of only 26 inches center to center, it has certain advantages from being pendent, and, as the practice to a large extent is to place two of these at intersections, diagonally opposite each other, good illumination can be secured. In common with most of New York's lighting standards, it has the excellent feature of height well above the general tendency in many other places, where low mounting heights have been found unsatisfactory and have been relegated to the category of poor practice.

The short over-hang of the bishop's crook constitutes a drawback. The style of post in the center below shows an incipient tendency toward overcoming this, while still utilizing graceful, curved elements in the design. This type is used extensively on the side streets of Manhattan and to some degree elsewhere.

The tendency of the most modern street-lighting practice towards a greater amount of projection over the pavement has already manifested itself in New York in the installation of many standards having an 8-foot projecting mast-arm, joined to the vertical standard with a simple grill work, so that it constitutes an ornamental rather than merely a utilitarian unit. There is also a somewhat similar standard, using a 10-foot arm.

On particularly well-traveled thoroughfares, especially the wider ones, considerable use of twin units is made, these again being pendent rather than upright. Various styles are found, some of them illustrated herewith. New York does not entirely scorn the upright unit, but employs it in special locations where desired for architectural effect.

The multiple system of distribution is widely used in New York, this being convenient on account of the closely built-up character of the portions of the city where most of the population work or reside.

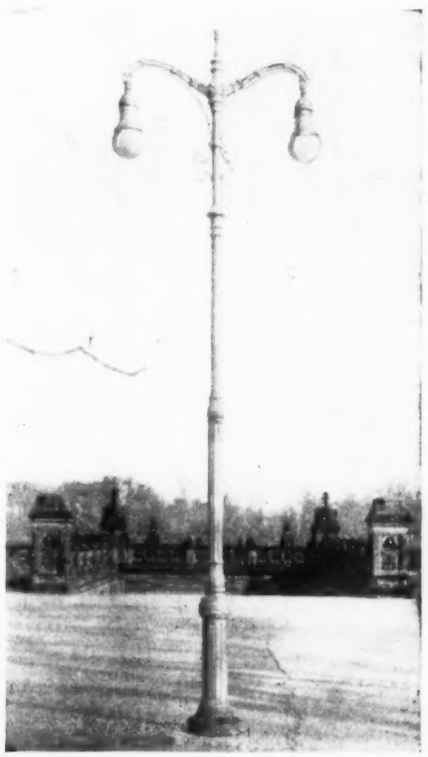
One factor having quite an important bearing on the effectiveness of street lighting in New York is the great prevalence of asphalt pavements. These acquire a considerable sheen from automobile traffic, the sheen being greatly increased, of course, in rainy weather. This characteristic of the pavement increases the silhouette effect at night and effectively supplements the street-lighting system in making objects in the street more readily perceptible to drivers.

Lighting the Streets and Sidewalks of New York

By **NICHOLAS J. KELLY**
Chief Engineer of Light and Power,* New York City

STREET illumination from any sort of stationary lights began in New York City 233 years ago, 74 years after the first white settlement on Manhattan Island, with the requirement that certain householders hang out candle lanterns on dark nights. The first publicly provided lighting was 55 years later, in 1752, when three oil lamps were placed outside of the City Hall. In 1826 there were 2,748 oil and gas lamp-posts to light the city, with its population of 120,000.

*The Chief Engineer of Light and Power is an official of the Bureau of Gas and Electricity, which is part of the Department of Water Supply, Gas and Electricity, headed by Commissioner John J. Dietz.



THREE LONG-ESTABLISHED TYPES OF NEW YORK LIGHTING UNITS

Left, Bishop's crook
Center, Type F
Right, Twin-light form of Type F, used in parkways and malls

Today the city has expanded into five great boroughs covering an aggregate area of 316 square miles, with a population of 6,930,446 people, according to the last census. At the beginning of 1930 124,226 street lamps were in service, emitting over 28,000,000 candlepower, and lighting 3,863 miles of streets. Twenty thousand lamps are added or changed to larger sizes and approximately 100 miles of new street lighting added to the present system annually. The yearly cost of street lighting is $5,465,720, for the year 1930, which, compared to the total tax budget of the entire city, is less than one per cent. The annual cost per capita is approximately 80 cents.

The secret of street-lighting success in this city may be attributed to standardization. A definite policy is strictly adhered to. It is our intention to supply light for general illuminating purposes, and not so-called "white-way" lighting.

In making provision for all future underground street lighting systems, the

NIGHT AND DAY VIEWS OF QUEENS BOULEVARD

Department keeps three purposes in mind: (1) to promote safety and convenience in the streets at night through adequate visibility; (2) to enhance the community value of the street; (3) to increase the attractiveness of the street. Safety and convenience in the streets at night are largely dependent upon easy and sure vision. Good visibility depends upon contrasts in brightness of surfaces and upon freedom from glare.

Classified Types of Lighting

In selecting street-lighting units the appearance and value of lighting at night are given careful thought. For appearance, the lighting unit is considered with relation to its surroundings, for esthetic purposes; and for value of lighting, the motorist, the pedestrian and the occupants of the property in the immediate vicinity are given careful regard. Every street under consideration for new lighting is classed as residential, business, or main traffic thoroughfare.

UNIT WITH 10-FOOT ARM
This has an approved luminaire for new installations

In residential sections, underground service, from 300- to 400-watt lamps on ornamental posts are placed on diagonal corners at street intersections, and in side streets a 200-watt lamp on an ornamental post is placed approximately every 150 feet, staggered. In overhead-pole-line areas, close spacing of houses, a 250- or 400-candlepower lamp is placed at each street intersection, and in side streets 100-candlepower lamps are installed approximately 100 feet apart, or, in less populated sections, 200 feet.

In business sections, underground service, a 400- to 750-watt lamp on an ornamental post is installed on diagonal corners at intersections, and in side streets a 300-watt lamp or larger is installed about every 150 feet, staggered. With overhead service, 600-candlepower lamps are placed at each intersection, and 250-candlepower lamps are installed approximately 120 or 240 feet apart.

On main traffic thoroughfares, underground service, 500- to 1,000-watt lamps on ornamental posts are placed on diagonal corners at intersections, and in side streets a 400-watt lamp or larger is installed approximately every 130 feet in staggered formation. With overhead service, 600-candlepower lamps are placed on diagonal corners at intersections, and in side streets 400-candlepower or larger lamps are placed approximately every 200 feet apart. All ornamental lamp-posts are placed at the curb, staggered, and all lighting units are mounted from 18 to 22 feet above the roadway.

The electric service furnishing the supply of current to these units is derived from eight public utility companies throughout the greater city. The upkeep and maintenance for such service, together with lamp replacements, is contracted for each year by the Department of Water Supply, Gas and Electricity with the lighting companies serving their respective territories. Seventy per cent of the entire street lighting is controlled from the distributing stations; recording instruments are installed on the switchboards to detect all irregularities or interruptions of service, and deductions are made for outages when not replaced within a reasonable time. Contracts are made on a basis of lamps burning 4,050 hours per annum, in accordance with a scheduled time-table prepared by the Department to conform in time to the sunset and sunrise. Experiments are continually being made with modern types of street-lighting units to determine their suitability for our system.

Ornamental lamp-posts for use of 200-watt lamps and smaller are designed and owned by the city. Posts designed for 300-watt lamps and over are owned by the company serving. Before a new type of post can be installed its esthetic features must be passed upon by the Municipal Art Commission.

To Obviate the Bright Headlight

The requirements of the ever increasing flow of traffic are constantly confronting the city with new problems. It has been our aim to light all main thoroughfares adequately with a view to inducing the man or woman who drives an automobile to dim the headlights within city limits. This is being successfully carried out by increasing the sizes of lamps and installing additional units along the principal streets or avenues heavily laden with traffic. In 1929 approximately $125,000 was expended to protect the traffic officer and to aid traffic by adding more than 1,000,000 candlepower to our present system.

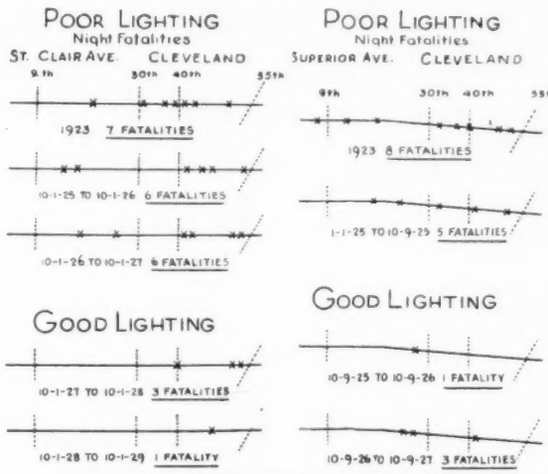
Street lighting and motor-vehicle lighting are obviously interrelated. Motor headlighting equipment is absolutely necessary where streets or highways are unlighted or poorly provided with artificial illumination. Where street lighting is adequate, it is practical and desirable for the motorist to drive with parking or marker lights only. Headlights of the type desirable for unlighted highways are often sources of glare, producing discomfort and ofttimes danger. Good street lighting means a decrease in the number of accidents, increased convenience, and improvement of property values.

Good Street Lighting Reduces Traffic Accidents

By KIRK M. REID
Illuminating Engineer, Nela Park Engineering Department,
General Electric Company

A FEW years ago, when the first so-called "White Way" street-lighting systems were installed following the development of the gas-filled lamp, it is probably true that the greatest single factor which led to these installations was their advertising value. The first lighting system of this type in any city or in any locality received considerable publicity. People noticed, commented, and came considerable distances to see it operate. Gradually it began to be appreciated that in addition to the advertising value of a good street-lighting system, it had other contributions to offer. Not the least of these has proved to be a reduction in traffic accidents.

One of the earliest investigations of the relation between street lighting and traffic accidents was conducted in the city of Cleveland during the year 1923. This consisted of a comparison of the night traffic accident experience on four comparable thoroughfares. At that time two of these—Euclid Avenue and Woodland Avenue—were well lighted. The other two—St. Clair and Superior—were poorly lighted. Each of these streets was of about the same width, had double-track street-car lines, and carried approximately the same volume of traffic moving east from the Public Square.



NIGHT FATALITIES ON STREETS UNDER POOR AND GOOD LIGHTING

Number and location of fatal night accidents on St. Clair and Superior Avenues, Cleveland, Ohio, during the periods of poor lighting and of good lighting

A Simultaneous Comparison of Different Streets

During the daytime, when the illumination on these streets was identical, an analysis of the Police Department records indicated that Euclid and Woodland—the well-lighted streets—had more traffic fatalities than the other two and therefore might be regarded as slightly more dangerous from the traffic standpoint. At night, however, it was found that during the year 1923 there was only one night fatality on each of the two well-lighted streets, whereas on St. Clair Avenue there were seven night fatalities and Superior Avenue had a total of eight. Apparently, then, the existence of the good lighting had a marked effect in reducing the night traffic fatalities. Or, conversely, the absence of good lighting made the two poorly lighted thoroughfares extremely hazardous.

The improved lighting system on Superior Avenue was placed in operation on October 9, 1925. Unfortunately, the Cleveland Police Department records prior to January 1, 1925, are not in sufficient detail to permit segregating the fatal accidents which occurred along this street. During the first ten months of 1925, however, there were five night fatalities on the street, indicating that the night traffic hazard was substantially the same as was found in the investigation two years earlier.

The year following the installation of the lighting system there was only one night fatality on the street, and during the second year there were three night fatalities. It is interesting to note that of these three fatalities one was an intoxicated pedestrian who fell down on the street, and another was a pedestrian who was struck by a hit-skip driver, which is usually considered to be proof of careless driving.

The lighting system on Superior Avenue consists of lantern-type units spaced 100 feet apart, opposite arrangement, with 25,000-lumen lamps and band refractors.

Accident Reduction with Improvement in Lighting

St. Clair Avenue was not relighted until October 1, 1927. During the first year preceding the installation of the good lighting system there were six night fatalities on the street, and there were also six night fatalities the preceding year. This is a remarkably close check to the seven night fatalities found on St. Clair Avenue in the 1923 investigation.

The year following the installation of the new St. Clair Avenue lighting system there were three night fatalities—two of these intoxicated pedestrians—and during the second twelve months there was only one—a pedestrian struck by a hit-skip driver.

The lighting system on St. Clair Avenue consists of lantern-type units, spaced 100 feet apart, opposite arrangement, with 10,000-lumen lamps and dome refractors.

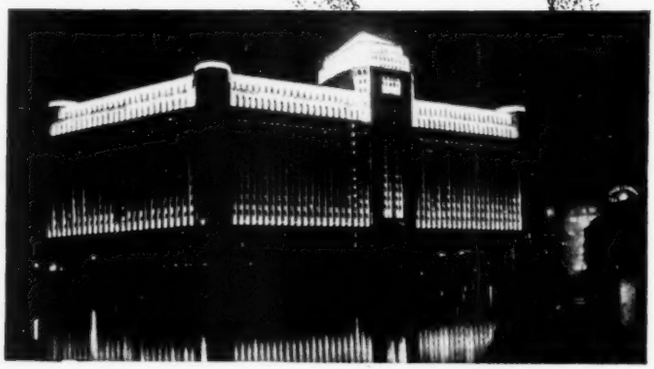
One might safely conclude from the traffic accident experience on these two thoroughfares that the street-lighting system had accomplished everything which one could reasonably expect. Further reductions in the traffic accidents would seem to depend largely upon more strict observance of the Prohibition Amendment.

ACKNOWLEDGMENT.—From a paper by Mr. Reid, presented before the convention of the American Society for Municipal Improvements, in Richmond, Va.

SUPERIOR AVENUE, CLEVELAND, BEFORE AND AFTER IMPROVEMENT IN LIGHTING

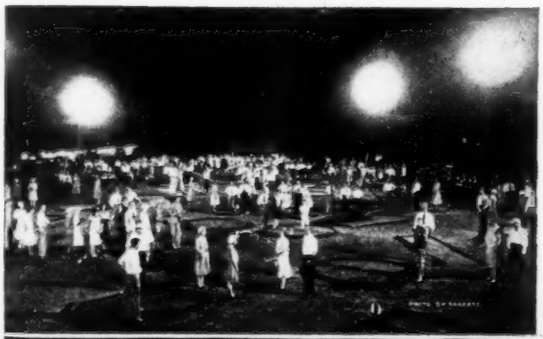
HIGH

G-E aviation beacon on La Salle-Wacker building, Chicago, Ill.
(Building illuminated by G-E floodlights)



Merchandise Mart, Chicago, Ill., floodlighted by G-E projectors

Miniature golf course, West Links, Wichita, Kansas, floodlighted by G-E Novalux projectors



Washington baseball park, Indianapolis, Ind., floodlighted by G-E projectors

Swimming pool, Webster City, Iowa, illuminated by G-E floodlighting projectors

Football field of St. Louis University, St. Louis, Mo., illuminated by G-E floodlights

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LIGHTS OF 1930

A RECORD of MUNICIPAL PROGRESS in OUTDOOR ILLUMINATION

THE NIGHT map of America became brighter than ever in 1930. City after city contributed high lights that marked its progress and its citizens' faith in the economic value of modern illumination. Here, a great street burst into a very blaze of business-bringing, safety-promoting light. There, great buildings took on new distinction under the glow of floodlights. Electrically lighted baseball and football fields brought unprecedented crowds to enjoy night games; electric fountains attracted throngs to city parks; airports were properly lighted for night traffic; highways were made safe for congested night driving; and city travel was expedited by modern traffic signals. With all this substantial economic improvement General Electric was conspicuously identified through the engineering and manufacturing experience which it brought to the solution of outdoor lighting problems and the superiority of the equipment which it installed.

Canal Street, New Orleans, La., lighted by G-E Novalux luminaires

Section of New York state highway, lighted by G-E Novalux luminaires

General Electric engineers are always at the service of public officials and civic organizations in planning lighting installations.

G-E Novalux traffic-signal installation, Baltimore, Md.

General Electric Novalux fountain, Bournemouth Corporation

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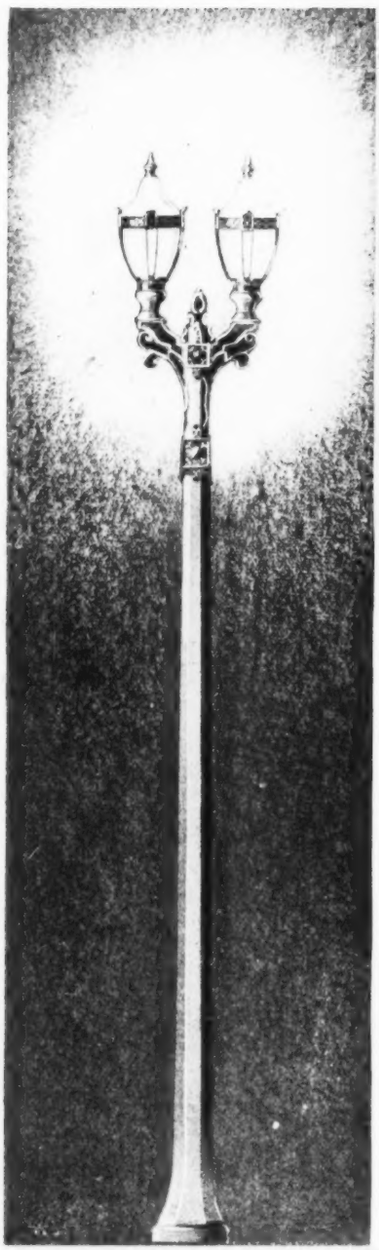
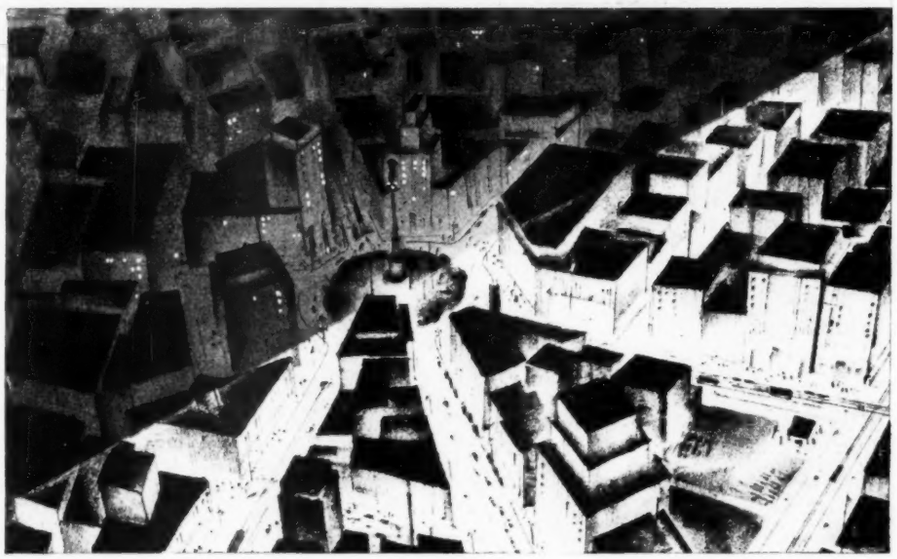
PROGRAMMED LIGHTING BRINGS MODERN CITIES OUT OF THE *Twilight Zone*





One of the most important assets any city can offer to attract new residents, new wealth and new industries, is its own civic "*personality*." Every city has such personality, but many unknowingly hide it in a Twilight Zone* of haphazard street lighting.

Today, thousands of municipalities throughout the world have adopted Westinghouse systems of *programmed lighting* to free themselves of Twilight Zone. Co-ordinated lighting not only insures adequate light wherever needed, but also affords a highly desirable uniformity of beauty and character throughout all districts and suburbs. It emphasizes civic personality.

The wide experience of Westinghouse Lighting Engineers with street lighting problems of every nature, now makes programmed lighting a complete service of undivided responsibility for the planning, engineering, installation and extension of modern street lighting for cities of every size.

An instructive booklet on keeping cities out of the Twilight Zone is available to all municipal executives. Communicate with the nearest Westinghouse office for full information.

**The deceptive half-light between obvious darkness and adequate illumination*

WESTINGHOUSE LIGHTING SPECIALISTS WILL HELP YOU PLAN AN EFFECTIVE LIGHTING SYSTEM

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Rounding Out a Quarter Century of Street Lighting Accomplishments

1906 Union Metal originated the first ornamental lighting standards as we know them today. Pioneering not only in design but in construction, Union Metal developed the pressed steel standard which was destined to write a new chapter in the history of street illumination.

This development removed street lighting from the purely utilitarian classification and emphasized its architectural aspects. In name the City Beautiful Movement was unknown but Union Metal was working toward the ideal for which that movement has won the praise of forward-looking citizens everywhere.

1931 Union Metal has become the world's largest producer of ornamental street lighting standards. Responsible for many of the outstanding developments in outdoor lighting, the company has retained its pioneering spirit and is constantly contributing new ideas to lighting progress.

By working closely with city officials, public utilities and illuminating engineers, it has helped to bring light and safety to thousands of American streets; it has championed light as a business builder, a crime and accident deterrent, an incentive to increased civic consciousness and a forerunner of prosperity.

So it is only natural that Union Metal should have supplied equipment for most of the outstanding White Ways in the country . . . State Street, Chicago; Canal Street, New Orleans; Euclid Avenue, Cleveland; Woodward Avenue, Detroit; the business sections of Los Angeles, Seattle, Indianapolis, Dallas, Atlanta . . . all are lined with tall, sturdy Union Metal Standards.

Union Metal ends its first quarter century of service to the electrical industry and to the public with the greatest year in the company's history and with increased facilities for engineering and producing street lighting equipment.

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San Francisco Says a Good Word for HAZARD

This cable reel truck used by the Department of Electricity, City of San Francisco, is an ingenious labor-saving tool. Note its simple construction and the ease with which heavy reels can be lifted and handled.

SEPARATE signal lights for pedestrians are part of the traffic control system now used in the congested centers of San Francisco. As increasing numbers of automobiles continue to complicate the traffic problem it is necessary to increase the control equipment and make it more dependable.

There are so many varying conditions among traffic signal installations that many types of signal cables are required adequately to meet every need. From among the complete lines of Hazard Municipal Signal Cables, San Francisco selected Hazard Lead Sheathed Cables for this underground installation, having had long and satisfactory experience with other Hazard cables in the City's electrical work.

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There is no more accurate gauge of community progress than streets well lighted — by ELRECO. Streets made safe for pedestrians and drivers during the hours of darkness when all hazards are greatly increased.

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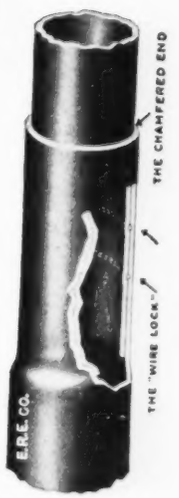
An ELRECO Engineered Lighting Project has no hard and fast limitations. Your needs and your budget form the basis for our recommendations — and frequently a limited budget is offset by ELRECO economical manufacture, factory assembly and ease of installation.

Use the coupon to get the facts about ELRECO Engineered Street Lighting « « « Projects. » » »



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"ANOROC" rubber insulation positively prevents the formation of corona and ozone within or about a cable at normal operating voltage. It retains all of the qualities which identify a high grade rubber compound.

Further information and details of tests are contained in a recent Simplex publication entitled "Corona Prevention and Ozone Elimination." May we send a copy to you?

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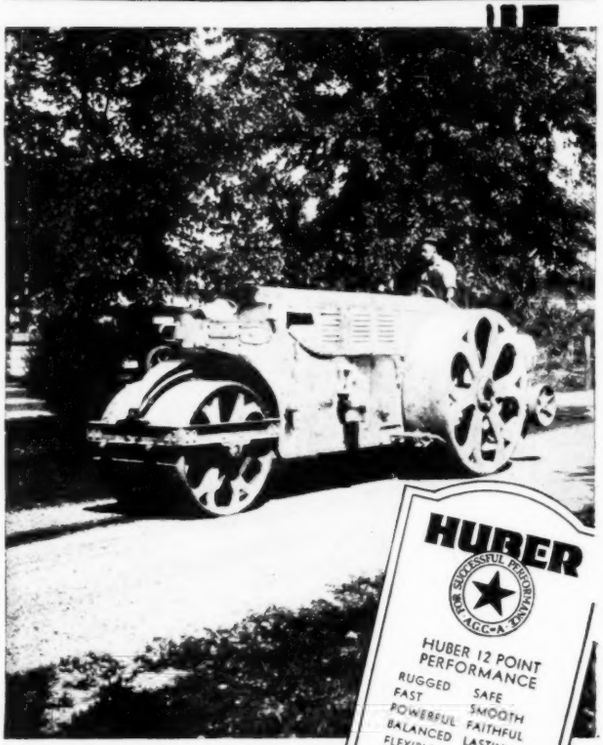

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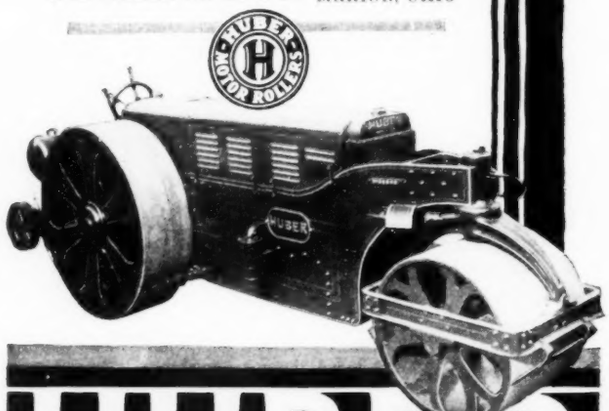

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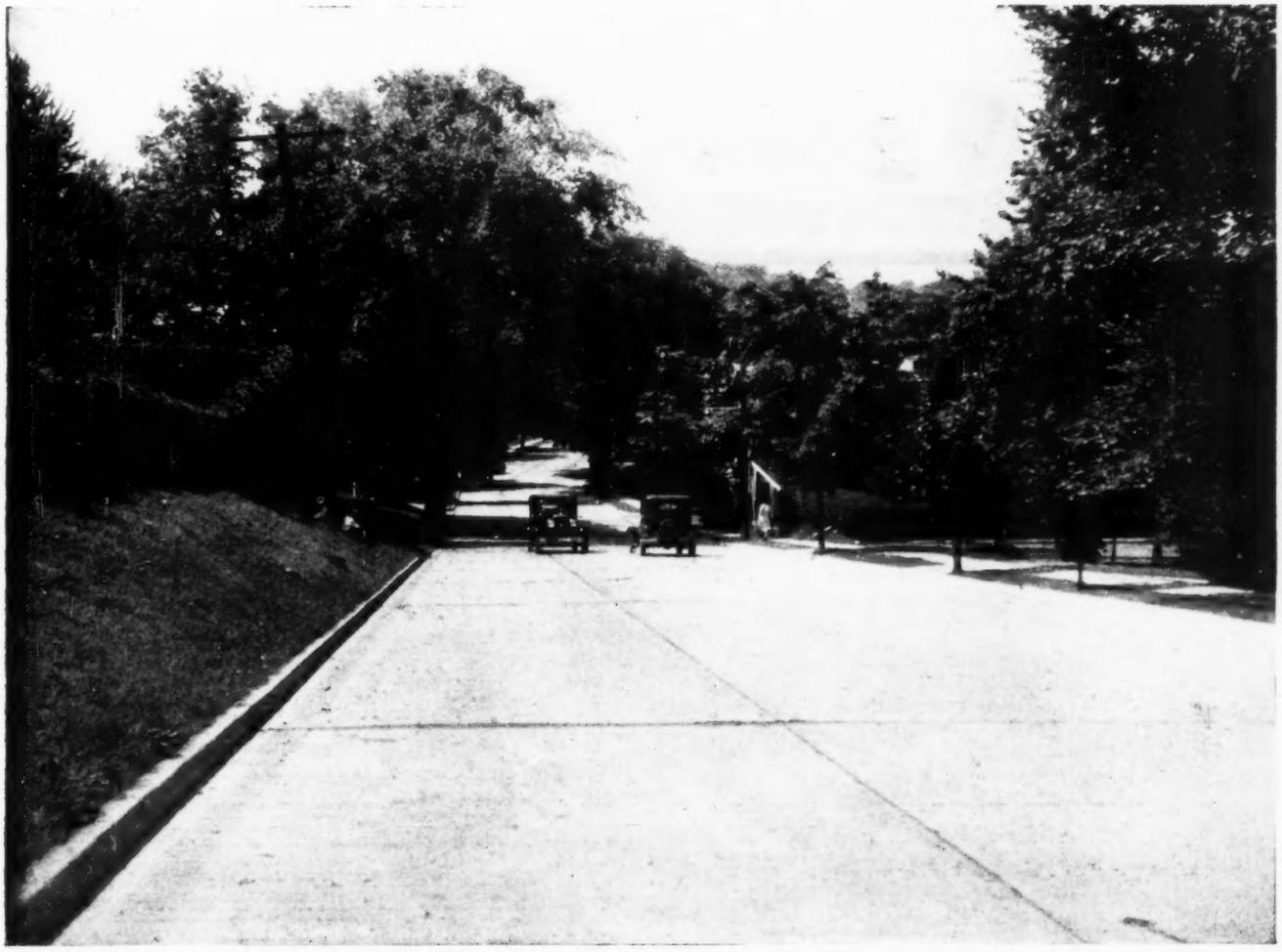

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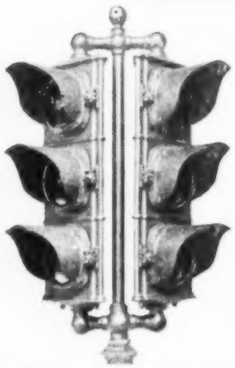

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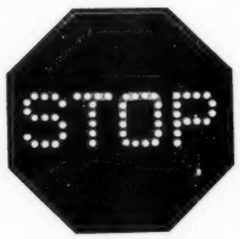

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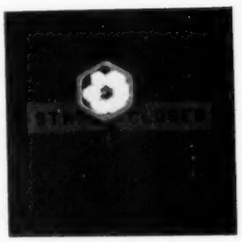

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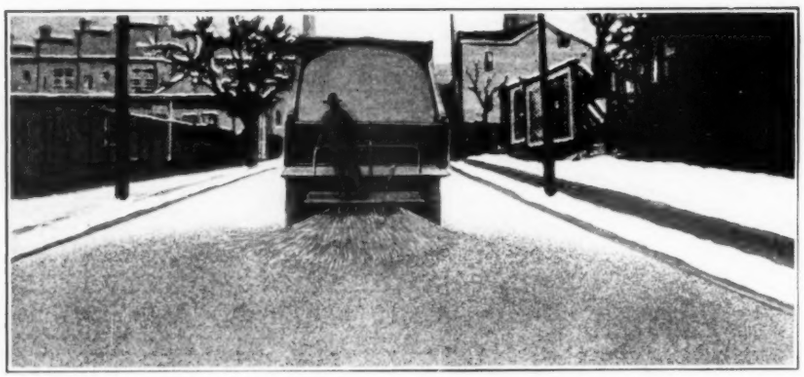

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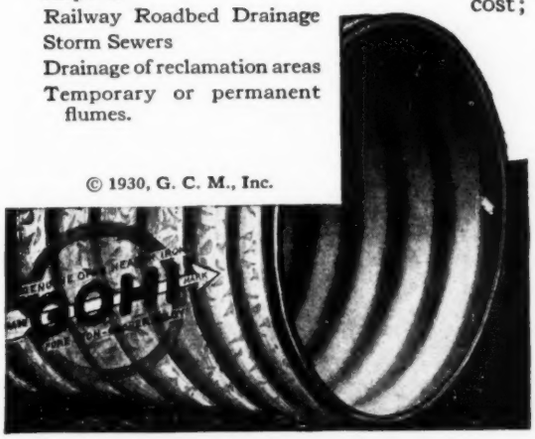

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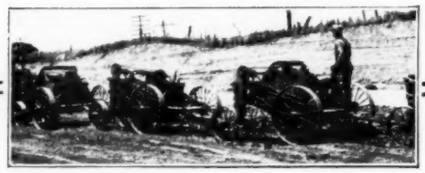

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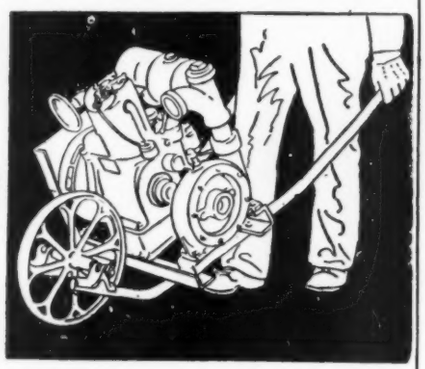

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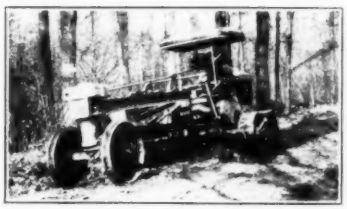

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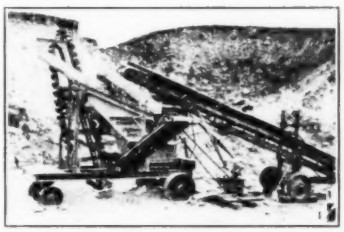

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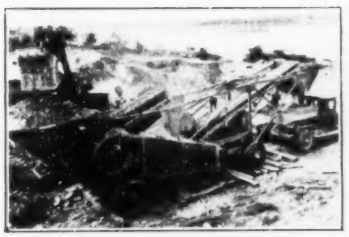

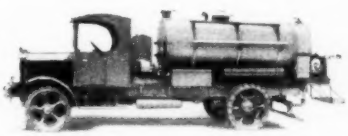

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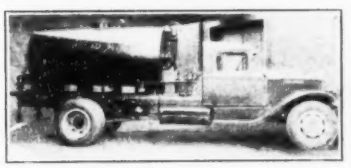

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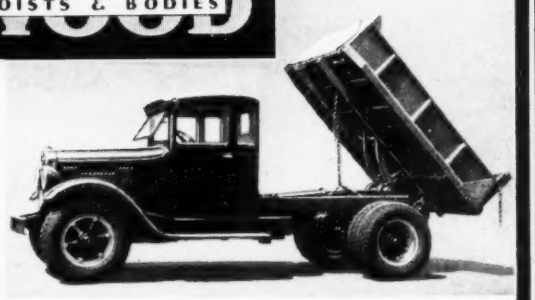

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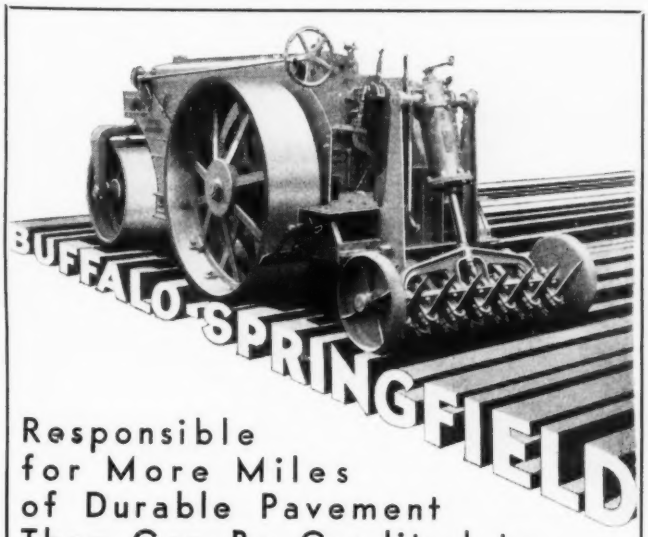

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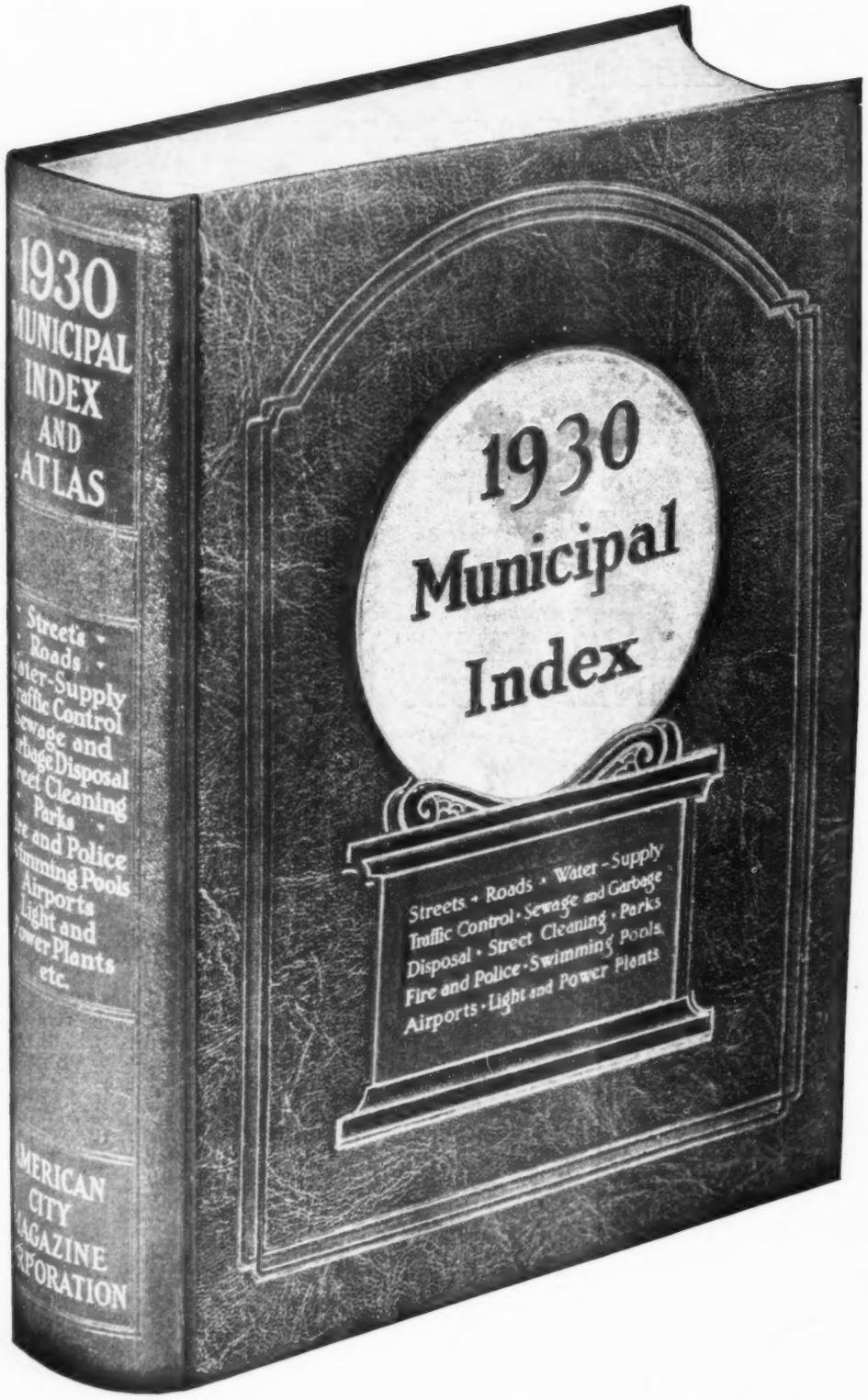

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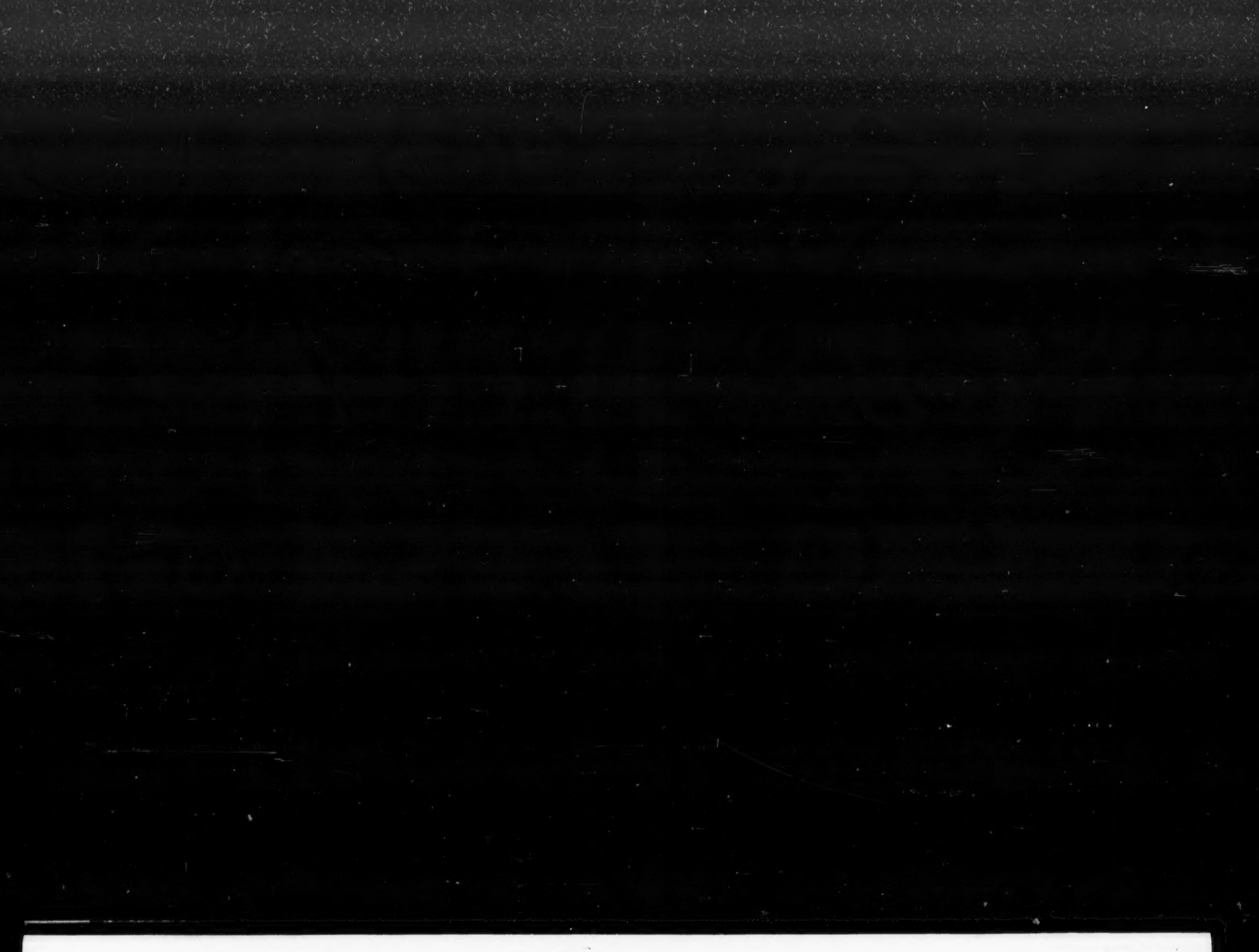

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(See plan and brief description on page 155 of this issue)